Welsh Critical Care Improvement Programme

Final Report
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Introduction

In May 2006 the National Leadership and Innovation Agency for Healthcare (NLIAH) launched the Welsh Critical Care Improvement Programme (WCCIP). This report evaluates the programme at the conclusion of the first year.

The programme has had two aims: firstly, improvement in quality of critical care provision throughout Wales by the implementation of the Ventilator and Central Line Care Bundles and secondly, promotion and evaluation of a collaborative programme methodology as a means of developing and spreading best practice and fulfilling the NLIAH organisational development aim of embedding change management skills in the Welsh NHS.

Background

Patients receiving critical care are at risk of infection associated with prolonged ventilation and central line dwell time. There are significant costs associated with this risk both in financial and quality of care terms.

It has been suggested that by combining a number of evidence based interventions in a ‘care bundle’ and administering these interventions to every critical care patient on every day of their stay, these risks to the patient may be significantly reduced\(^1\).

Care bundles have been advocated by the Institute for Health Improvement (IHI) and Centre for Disease Control (CDC) in the US and have been promoted by the Modernisation Agency and Department of Health in the UK as ‘High Impact Changes’\(^1\).

Prior to commencement of this programme the level one evidence supporting the Ventilator and Central Line Bundles was widely accepted by Welsh clinicians but although care bundles were in place in some critical care areas in Wales, there was no uniformity of definition or measure of application; this programme has worked towards standardisation of this otherwise disparate approach.

This programme has been implemented against a backdrop of huge change in Welsh critical care with the formation of three critical care networks in 2006-07, the publication of the Critical Care Quality Requirements (WAG 2006) and Healthcare Quality Improvement Programme (WAG 2007).

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Collaborative Programme Methodology

The collaborative programme methodology originates from the work of the Institute for Healthcare Improvement in the USA when, in 1996, they launched the ‘Breakthrough Series’ of quality improvement collaboratives. A collaborative programme is a comprehensive way of creating specific improvements for patients based on evidence-based principles for spreading good practice using proven improvement techniques.

The programme methodology supports participating Improvement Teams in implementing changes by creating the time and opportunity for teams to reflect and discuss. Improvement teams then use a continuous method of improvement in which ideas for change are tested on a small scale. Results are analysed and either implemented or further refinements made to make the changes more effective. Changes are of an incremental nature, but the increments are very fast and expected to progress rapidly to wider and bigger change. The collaborative programme goes on to actively encourage spread and sustainability of the proven improvements.

A critical component of the collaborative methodology is sharing information and learning from each other’s experiences. Knowledge sharing provides powerful peer support and encouragement for continued modernisation. Case studies presented at learning workshops will provide an opportunity for improvement teams to see what changes others are making and decide whether those changes can be adopted or adapted to their own working practices.

Local Improvement Teams

The improvement groups at a unit or Trust level were composed of clinical and executive leads as well as patient and therapies representation. They were led by Programme Managers, generally senior nurses who had taken the lead in training ICU staff. The teams implemented the programme locally, introducing innovation and collecting and processing the data.

Team Learning Events

Four national events were held from May 2006 to March 2007. These events have served to agree the bundle contents, inform on programme progress and national critical care policy, and decide the direction for the smaller local improvement groups.

Programme Manager Training

The Programme Managers carried a huge responsibility for the success of the programme and it was therefore considered vital that the programme be of benefit to their career and personal development. NLIAH has provided training in change skills, leadership, teambuilding and data handling as well as facilitating a forum for mutual support and sharing of experience.

Steering Group

The WCCIP was conceived as part of a larger patient safety programme linked to the Healthcare Quality Improvement Programme (HQuIP). The strategic direction and high level decision making on the programme took place at the quarterly steering group meetings. The membership of the steering group is listed in appendix III.
Data collection strategy

Baseline Data
A scoping exercise prior to the launch of the programme demonstrated that there was no national consensus on outcome measure definition, application or data collection. It was therefore considered of little use to attempt pre-programme baseline measurement of Average Length of Stay (ALoS), ventilator time or infection rates at a national level.

Instead, process data has been collected and analysed by daily measurement of individual patient, unit level and national compliance with the care bundles. Some units have also carried out their own baseline assessments and have continued to monitor outcome as well as process measures.

Bedside Monitoring
The systems for collection of the process data on compliance with the care bundles were developed by the individual units and therefore contain some variation in approach.

However, there are several common features. In all but one unit the system was paper based and relied upon the bedside nurse ensuring that a form, similar to that below (figure 1), was completed on a daily basis.

Bundle elements were ticked as completed, signed if not completed and reasons for exclusion from the bundle recorded.

Figure 1 - bedside ventilator compliance form

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>Clinical Exclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>DVT Prophylaxis</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>GU Prophylaxis</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Head Elevation - 30°</td>
<td>✓</td>
<td>✓</td>
<td>✓</td>
</tr>
<tr>
<td>Sedation Hold</td>
<td>✓</td>
<td></td>
<td></td>
</tr>
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Bundle compliance was ‘all or nothing’ in that patients were only considered compliant if all elements of the bundles had either been performed or a reason had been given for not doing so.

Database
NLIAH developed and hosted a web based database, onto which the local Programme Managers entered the daily figures for number of eligible patients and number compliant thus giving a percentage rate.

The database then generated reports giving mean monthly compliance with the care bundles for each unit.

Daily compliance for the unit for all eligible patients upon that unit was recorded on a chart similar to that below (figure 2).

Figure 3: Screen Shot of Web-based Data Collection and Reporting Tool
Evaluation of the Collaborative Approach

The collaborative programme methodology that was adopted for this programme was evaluated, as one of the aims of the programme itself, by the University of Glamorgan. The following section is an extract from the Executive Summary of that report:

The WCCIP had ambitious aims. Achieving significant change in clinical practice is never easy; to do so simultaneously across all Trusts in Wales, in a pre-determined timescale, with no ability to enforce change other than professional and managerial influence, and when the service is beset by numerous initiatives, is indeed ambitious. But it succeeded... this experience demonstrates that this sort of collaborative model, when appropriately led and resourced, is one which should prove adaptable to other similar clinical change tasks.

(See Executive Summary at Appendix II)

The WCCIP has been extremely well received with 'buy in' at CEO and clinical level from all Trusts in Wales. Participation in the programme has been genuinely multidisciplinary as evidenced by the numbers and diversity of background in attendance at the WCCIP events.

The feedback from these events and from the programme as a whole has been overwhelmingly positive. Critical care practice has reportedly been challenged, improved and standardised whilst clinicians report that the programme has empowered them to be innovative in introducing and managing change.

(See organisations reports at Appendix I)
‘All Wales’ Care Bundle Definitions
The programme was launched in May 2006 at an event which was attended by approximately 80 delegates representing the medical, nursing and managerial workforce of every critical care unit in Wales. A similar number and mix of delegates have attended all events since the launch.

Following extensive consultation and debate at this event an ‘All Wales’ definition of the Ventilator Care Bundle was agreed. All fourteen critical care sites across Wales have adopted and implemented this Ventilator Care Bundle.

Elements of the Welsh Ventilator Care Bundle
• Daily sedation rest
• Elevation of the head of the bed.
• DVT prophylaxis
• Peptic ulcer prophylaxis
A learning event was held in July at which all fourteen critical care sites and Velindre Cancer Centre were represented. Agreement was reached at this event to adopt two CVC bundles rather than the one advocated by the IHI. These bundles have now been implemented across all sites.

Elements of the Welsh Central Line Insertion Bundle
• Wash hands before and after procedure: soap and water or alcohol-based agents.
• Use barrier precautions: gown and gloves must be worn; as much as possible of the patient should be covered with sterile drapes.
• Sterilise skin with chlorhexidine in alcohol and wait until the skin is dry.
• Avoid the femoral site unless it is the last resort.

Elements of the Welsh Central Line Maintenance Bundle
• Review necessity of central line every day - and remove promptly if it is not needed.
• TPN should be given via a separate line or a dedicated lumen.
• Access to line must be made using an aseptic technique.
• Entry site to be checked every day for signs of leakage or inflammation.

Implementation of the Care Bundle Methodology
Following agreement upon the elements of the care bundles, take up by intensive care units has been relatively quick. The following graph (figure 4) demonstrates that all eligible units were using the ventilator bundle and have continued to do so as of August 2006. As of March 2007 all units were using the CVC maintenance bundle.

Figure 4 - adoption of care bundles in Welsh ICUs

Care Bundle Compliance
Compliance with the care bundles that have been introduced as part of the programme has been calculated as a percentage at each site on each day of the programme and has been stored on an NLIAH hosted database.

As this compliance figure represents a reduction in adverse events due to omission of treatment it is suggested that it may be used as a proxy for quality improvement in critical care.

The mean all Wales compliance with these interventions reached 97.5% in March 2007 following a year of steady improvement from a low compliance position. By using this number as a surrogate it is suggested that quality improvement in Welsh critical care has been demonstrated.
Clinical Engagement

Medical involvement has been a key element of the programme throughout planning and implementation. The Welsh Intensive Care Society as a whole, led by Chairman Dr Ian Greenway, has shown consistent support. The learning events have provided the opportunity for clinicians to meet and discuss the scientific and practical aspects of the bundles. This has resulted in consensus for national guidelines, process and outcome measures. Clinicians are generally enthused by the simple way that care bundles link theory to actual behaviours, resulting in benefits to patients. Collaboration with nurses, AHPs and managers from not only their own Trust, but from around the country, has been a positive experience for the doctors involved.

**Dr Dave Hope – Programme Clinical Lead:**

"Looking back at a year of the WCCIP one thing amazes me - how a simple idea can have so many consequences. Care bundles are easy: simply decide what you should be doing, then make sure you’re doing it every day on everybody that needs it. To actually achieve these goals turns out not to be straightforward however - several important things have got to happen first:

- Realisation that we are far from perfect
- Creation of a multidisciplinary group of motivated people
- Agreement on national clinical guidelines based on evidence
- Staff education on a large scale
- Implementation of a data collection and analysis system
- Detailed and prolonged feedback at local and national levels to improve practice

All of these steps have now been achieved and a new ‘quality improvement’ culture has been born in the process. This is a tribute to the enthusiasm and hard work of everyone involved in the Programme; it has been a pleasure and a privilege to play a part in the team.

There have been several positive spin-offs from our work already, including increased patient/carer involvement and linking up with efforts to reduce hospital acquired infections. Several areas outside of critical care are looking at our approach to see if it will work elsewhere. When I see the compliance rate graphs from around the country saying 95-100% compliant for this, that and the other I feel very proud. A huge number of patients are benefiting from improved standards of care as a direct result of our efforts. Next year will bring fresh challenges but I have every confidence that the team we have assembled are up to the task. Well done and thanks to everyone who has helped make it happen."

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**Ventilator Bundle**

Ventilator bundle compliance rates for 13 of 14 (94%) critical care sites in March 2007 were greater than 95%. The aggregate national compliance has risen from 82% in June 2006 to 97% in March 2007 (figure 5).

**Central Line Bundle**

Central line maintenance bundle compliance rates for 13 of 15 (87%) sites posting data in March 2007 were greater than 95%. The aggregate national compliance has risen from 26% in June 2006 to 98% in March 2007 (figure 6).
Daily Process Audit
A consequence of the daily audit that this programme has introduced is the realisation that interventions which had been assumed, by ICUs, to be standard practice were, in fact, subject to considerable variation.

Although, in this programme the target for compliance was greater than 95%, it appears likely that real change to the custom and practice of the ICU only becomes sustained when compliance has been stable at 100% for some time.

At what point the daily audit could be relaxed to a weekly or monthly regime with no resultant change in compliance is yet to be ascertained. There have been reports that suggest that a falsely high level of compliance may be attributed to the time of day that the audit takes place which suggests that, prior to reducing the frequency of audit, units should demonstrate high compliance rates at ‘spot’ audits at varying times during the day.

The daily care bundle compliance has been shown to be very responsive to other changes in the workload and staffing of the units so it may be argued that it can be taken to act as a surrogate for the change process itself.

We believe that this frequent audit, rapid feedback model has huge potential for the introduction of change in a variety of clinical settings.

Evaluation of Patient Outcomes
The outcome measures that have been advocated by the IHI are average length of stay (ALoS), average ventilated time, mortality and infection rates (Berenholtz et al, 2002). The scoping report had identified that there was no national consensus upon these measures and so evaluation of the programme at a national level using these measures has so far not been practicable.

It is possible that cultural and organisational differences between critical care in the US and UK will prevent a replication of the change in outcomes that has been suggested by the IHI although results from Conwy and Denbighshire, where care bundles have been in use for three years as part of the Safer Patient Initiative, demonstrate a reduction in mortality, non-clinical transfers and a 2.7 day reduction in ALoS.

The report from this Trust (Appendix I) however makes clear that changes in outcomes did not happen for eighteen months following the introduction of care bundles and that the ALoS figure only changed following the introduction of nurse led weaning. This suggests that it is not the care bundles in isolation that lead directly to changes in patient outcomes, but rather it is the re-evaluation and development of care systems that have come about as a result of the whole programme of improvement which are responsible.

Several units have experienced a reduction in the use of sedation which has been directly attributed to the ventilator care bundle. The value of this reduction has been estimated as 25% by UHW, 30% by Bronglais and £18700 by North Glamorgan NHS Trust. Conwy and Denbighshire have experience a total pharmacy reduction on critical care items of £78587 since the introduction of care bundles.

Collaboration between WCCIP and WHAIP has been invaluable in developing critical care infection surveillance in Wales. It is expected that all ICUs in Wales will duplicate the UHW experience where, since the introduction of the central line care bundle, MRSA bacteraemias have been reduced by 50%.
Critical Success Factors

Following analysis of the organisation reports, the following critical success factors (CSF) have been identified as key to the success of local implementation of the Ventilator and Central Line Care Bundles.

Programme Managers

Throughout the programme it has been shown time and again that the most important factor in local success is the Programme Manager. These individuals have shown extraordinary determination and resilience in motivating their teams and introducing innovation. They have achieved this often in the absence of adequate funding and in some cases whilst having to overcome considerable resistance to change.

The Programme Manager training and study days have proved to be popular with the Programme Managers themselves as both a source of support and as a means of acquiring practical skills. Protected time to fulfil this role is invaluable and it is noticeable that sites where this role has not been backfilled have struggled at times in maintaining the momentum.

Local Champions

Clinical and managerial support for this programme locally has been essential to the successful implementation and sustainability of the care bundle approach. The programme has required substantial amounts of senior staff time in the planning, implementation and monitoring of the sustainability of the care bundles in the units, and without managerial and clinical support, this resource would not have been made available.

Patient Involvement

At the outset of the programme, patient involvement was not common within critical care across Wales. Patient involvement on the National Steering Group has been key to ensuring the right questions were asked at key points in the programme, and has promoted local involvement of patients and carers on improvement teams. These teams have since stated that this is a key element of their success, as it provides a unique perspective which NHS staff often overlook and underestimate.

The steering group representative has now produced a pack which is intended as guidance for recruitment of a patient/carer representative on the local improvement team.

Ownership of Change

The collaborative approach NLIAH have taken to agreeing and implementing national bundles have ensured buy-in from all sites, clinicians, nursing and therapies staff prior to implementation. It is an often repeated axiom that for change to stick it must be owned by those affected by that change. There is ample evidence within the unit’s progress reports (Appendix I) that this is true. It may also be claimed though that the audit process to evaluate the change itself is also most effective when developed and owned by those participating.

Spread and Sustainability

The collaborative approach of the programme has stimulated and provided a forum for national debate and has enabled the growth of networks and communities of practice. We believe that the collaborative methodology of the programme has been shown to be effective and will enable a national approach to other areas of critical care development in the coming years.

The second year of the programme will build upon the successes of this year to promote, support and evaluate a ‘whole hospital’ approach to improving patient safety through infection surveillance, dissemination of ‘bundle methodology’, adoption of sepsis bundles and implementation of a critical care outreach service. Participating Trusts will consolidate the ‘care bundle’ methodology that has been implemented through the WCCIP, creating further bundles and disseminate the process to areas outside the intensive care unit.

 Collaboration with the Welsh Healthcare Associated Infection Programme (WHAIP) will continue and infection surveillance will be augmented to provide patient and organism specific data. Links to the Critical Care Networks will be strengthened and the newly appointed network managers will be invited to sit as members of the WCCIP Steering Group.

The estimated number of ICU admissions in Wales in 2005 was 8206 of which 19.7% were for severe sepsis (ICNARC 2006). Mortality for severe sepsis remains at 30-50% or up to 800 people in Welsh ICU’s annually and severe sepsis accounts for 46% of critical care bed days1. Effective treatment of severe sepsis therefore represents a considerable potential saving both in financial and mortality terms.

The programme will collaborate with the surviving sepsis campaign (SSC) in implementing the sepsis bundles within Welsh ICUs and, through development of the sepsis resuscitation bundle, it is intended that participants in this programme will participate to areas outside the intensive care unit.

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Observation of clinical practice suggests that quality of patient care has improved—
the use of longer acting sedation has now been reduced to a minimal. This has led
to a reduction in patients experiencing a sedation hangover. In addition there has
been a reduction in the cost of sedation used per patient.

Central lines are now removed at least two days earlier than previously and many
patients are managed without central lines.

Plans for the next year are to continue disseminate this work throughout the trust
and build on this by monitoring our central line infection rates and our ventilator
associated infection rate.

The tracheostomy care bundle has now been written this will initially commence in
critical care and then be disseminated trust wide.

The Care Bundle approach has been seen to be a positive experience with very little
resistance it has improved the equity of research based care given to patients.

As a Programme Manager it has been invaluable to have the support of my
colleagues not only within the trust but also my fellow Programme Managers.
We have been able to share experiences, resources and above all keep each other
motivated.

**Bro Morgannwg NHS Trust**

Following the year long project to introduce the ventilation and central line care
bundles both are now up and running well, with compliance rates improving steadily
and are now 100%.

In addition theatres are running the central line insertion bundle and Casualty are
due to commence the pre audit for the central line bundle.

The sepsis care bundle commenced in critical care. However, two study days were run for
senior nurses across the trust to inform them of concept of care bundles with a view to
taking the central line and sepsis care bundles out to the wards. These were well attended.

Feedback from senior nurses across the trust was that they wanted additional training
on caring for central lines first, this was planned for February. Due to workload not all
sessions were able to run and this work is continuing in May 07.

Coronary Care have shown a considerable interest in commencing the central line
and sepsis care bundles. Therefore, work is currently underway with this.

There have been many positive aspects to this project the collaborative approach to
clinical practice, the sharing of information and resources between clinical areas.
Appendix I

INTRODUCTION OF CENTRAL LINE CARE BUNDLE

BACKGROUND

The introduction of various care bundles into Critical Care has followed the work of the NHS Modernisation Agency’s project on critical care outcomes, which was active only in England. A “care bundle” is simply a grouping together of individual care elements for particular treatments, such as ventilation, or symptoms or procedures. The elements are chosen because there is evidence to support their use in improving outcomes. Use of the elements can be easily audited so that feedback can be provided and any problems in implementation identified. This means that we can check if what we think we do is what we actually do!

AIMS

The aim of the central line care bundle is to reduce infection and complications to patients who need a central line. All elements of the bundle should be routine care for ALL patients unless specifically excluded.

ELEMENTS OF CENTRAL LINE CARE BUNDLE

Central Line Insertion Bundle
- Wash hands before and after procedure using 4% chlorhexidine gluconate bactericidal skin cleanser and water or other alcohol-based agents
- Use Maximal Barrier precautions: gown, gloves and drapes
- Sterile skin with Chlorhexidine and wait until the skin is dry
- Use of jugular or subclavian routes as preferred sites.
- Central Line Maintenance Bundle
- Review necessity of central line every day and remove promptly if it is not needed
- TPM should be given via dedicated lumen.
- Biomarker on all ports no 1 way taps.
- Access to line must be made where appropriate
- Entry site to be checked every day for signs of leaking or inflammation

WHAT NEXT?

Data has been collected on our current use of the various elements in the central line care bundle. The 1st of August 2006 has been selected as the date for The Central Line Care Bundle to commence. All staff should then make every effort to ensure all elements of the central line care bundle become routine care for ALL patients. There will be an ongoing teaching programme to inform staff about the care bundle. In addition there will be a study day on 17th July 2006.

REFERENCES


INTRODUCTION OF VENTILATORY CARE BUNDLE

BACKGROUND

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AIMS

The aim of the ventilatory care bundle is to use these elements to reduce ventilation associated complications such as pneumonia and thromboembolism and to reduce the duration of ventilation. All elements of the bundle should be routine care for ALL patients unless they are specifically excluded.

ELEMENTS OF THE BUNDLE

30° head up positioning
- This has been shown to reduce the incidence of microbially confirmed ventilator associated pneumonia from 23% to 5% when compared to supine positioning.
- DVT prophylaxis
- DVT is common in both medical and surgical patients in a critical care setting with rates of up to 54%. Prophylaxis can reduce this significantly.
- Gastric ulcer prophylaxis
- All patients should be protected by ranitidine or omeprazole or enteral feed.
- Avoidance of excessive sedation
- Duration of ventilation is known to be a risk factor for ventilator associated pneumonia. In all patients we should be aiming for a sedation score of 0 or 1. Use of sedation scores and protocols can reduce ventilator time.
- A daily sedation hold has been demonstrated to be a safe effective way of reducing duration of ventilation and ITU stay.
- There was NO increase in the incidence of accidental extubation.

WHAT NEXT?

Data has been collected on our current use of the various care bundle elements. The 1st of December has been selected as the date for the project to begin. All staff should then make every effort to ensure that this becomes routine care for ALL patients. Nursing staff should feel able to remind junior doctors if any of the prescribed elements have been overlooked.

REFERENCES

Appendix I

National Leadership and Innovation Agency for Healthcare

Cardiff and Vale NHS Trust

Programme Manager (Llandough): Derek King

Programme Manager (University Hospital Wales): Nia Bromage and Lisa Evans

Llandough:

Llandough critical care comprises 5 commissioned level 3 beds and 4 level 2 beds, with one additional level 3 beds in times of need. We are a friendly department with a long tradition of implementing evidence based care.

When I was appointed Programme Manager in May 2006 I had a (very) basic understanding of the ‘care bundle’ conception, but did not appreciate the enormity of coordinating and implementing actual care bundles in practice. In this regard the expertise offered by NLIAH has been invaluable, especially in conjunction with the advice and support gained from the other Programme Managers.

The Ventilator Care Bundle

Following the May 2006 Programme Manager’s day and national learning event, we introduced a trial audit to ascertain current unit practice.

This demonstrated:

- Unexpected incidences of evidence based practice (as per bundle)
- Unexpected incidences where best practice was omitted.

From these surprising results an action plan was developed, this being implemented with the use of PDSA cycles. The ventilator care bundle was formally introduced in June 2006.

Compliance to all four elements of greater than 95% was attained by July 2006 with 100% compliance achieved by September; this level of compliance has been maintained to date.

Various tools of data collection have been employed, with revisions made to accommodate lessons learned and improve efficiency. The biggest problem with ‘bundle’ implementation was found to be data collection by the senior nurses, with a 70% initial collection rate. After much motivation and the tenacity of the ‘bundle team’, we have achieved and maintained a collection rate of 100%.

Head Raised 30 degrees

Patients have been traditionally nursed supine at Llandough; this was reinforced by the pre-audit which showed that one third of patients were nursed in this manner.

Despite a big change in the culture of nursing patients supine, this intervention was accepted and adopted immediately producing greater than 95% compliance by July 2006. Auditing compliance for this (and the other bundle elements) at various times through the day, demonstrates that this element had been successfully adopted.

Sedation Hold

It was initially regarded to be the most difficult element to introduce: because the majority of critical care nurses felt that this intervention would increase patient anxiety levels, ICU psychosis and the risk of self extubations.

PDSA cycles were used to target this intervention, resulting in a resounding 100% compliance achieved by July 2006.

Initially the instigation of the sedation hold was ordered during the consultants ward round, but this has resulted in sedation holds commencing at 14.00 hours for some patients during busy periods.
To address this issue, we have implemented nurse led sedation hold at 08.30 hours according to guidelines agreed between the ‘bundle team’ and consultants. This change will now be closely monitored to determine its effects.

A large part of the critical care pharmacy budget is spent on sedation. With the successful introduction of the sedation hold we are currently considering a move from the more expensive propofol, as a sedation agent, to the more cost effective morphine / midazolam combination. This is because a daily sedation hold should limit the longer sedative effect of morphine and midazolam and enable considerable cost savings to be made.

**Peptic Ulcer Prophylaxis**

The pre-audit demonstrated that most of our case mix (93.7%) already received PU prophylaxis. We quickly achieved 100% compliance due mostly to the enthusiastic uptake of bundles by our consultant staff. These excellent compliance rates have been maintained with 100% compliance seen monthly.

**Deep Vein Thrombosis Prophylaxis**

Three quarters of patients already received DVT prophylaxis at pre-audit. Again with the help of our consultants we have quickly (June 2006) achieved and maintained 100% compliance rates.

**Central Line Bundle**

Following on from the successful introduction of the Ventilator Care Bundle, in August 2006 a pre-audit was conducted to determine compliance with the proposed two central line bundles.

This demonstrated that practice was already of a high standard and highlighted 3 areas where improvements were required. A collaborative approach with our consultant staff was employed.

**Barrier Precautions**

Though the use of sterile gown and gloves was already employed, the routine use of hat and mask was not general practice. These elements were quickly and easily adopted by the junior medical staff enabling 100% compliance by September 2006.

Skin Sterilisation.

Traditionally skin preparation was performed on our unit using Betadine alcoholic solution. However despite early concerns from the ‘Bundle Team’ about the uptake of chlorhexidine solution, this was quickly embraced and 100% compliance achieved and maintained since September 2006.

**Access to Site using Asepsis**

The pre-audit displays a very poor result for this element. This was because we had not agreed on a protocol for drug/infusion administration via CVC locally. When protocols were established, 100% compliance was achieved and maintained.
Appendix I

Results
Since September 2006, compliance for all bundles has been maintained at 100%.

Ventilator Acquired Pneumonia (VAP) data is also inconclusive but this is based on
limited data as VAP rates have not been previously collected (to give a baseline).

Catheter Related Bloodstream Infection rate pre bundle was 0 and remains at 0.
Therefore no conclusive evidence is apparent at Llandough yet. However the introduction
of infection surveillance has highlighted a need for us to be more vigilant in other
areas of infection prevention and control.

Staff Views

‘Ventilator Care Bundles introduced into the intensive care setting have
advantages for both patients and the NHS by reducing the incidence of ventilator
acquired pneumonia for ventilated patients.

Introducing the bundles has been very easy in Llandough as this is a fairly small
unit. It involves the standardisation of practice, which takes very little time to
perform and have long term positive effects.

We as nurses must ensure patients are cared for in the most appropriate manner
ensuring their health and safety.’

Marion Ross, Senior Staff Nurse

‘Excellent, ensures high standards of holistic care are implemented and maintained.
Bundles ensure that every patient is given the same care and opportunities in
critical care, thus reducing inequalities in care. They provide a clear, concise
method which is easy to follow.’

Jayne Kent, Staff Nurse

‘As newly qualified band 5 nurses, the care bundles have provided a useful
structure to help us plan the care of our patient. They enable us to provide
evidence based care ensuring the patient receives optimum treatment.’

Emily Taylor and Sian Evans, Junior Staff Nurses

However, a mini-audit on junior doctors (SHO and Registrar level) showed that none
knew what a ‘Care Bundle’ was though all were implementing the elements of them.
Clearly some work still needs to be done!!
Appendix I

University Hospital Wales:

I have been the deputy project manager since the introduction of the care bundles. My role has been small and one of a supportive role to the project manager. The project managers mid term report highlighted the vast amount of knowledge and skills that she had developed through the introduction of the care bundles. I myself would have to agree with her comments and feel that my skills have vastly increased due to the role that I had in ensuring the implementation of the care bundles and their daily compliance. My confidence and leadership skills have developed and I am able to challenge practice for the good of the patient, I feel comfortable in educating staff at all levels about care bundles and how they can benefit staff and patients. I have been able to develop links with our other unit on another site whilst increasing my links with more senior staff within the unit in which I work.

Overall, the introduction of the care bundles has had a positive effect on nursing and medical staff. Patient care has been standardised throughout the unit. The care bundles have given all staff the confidence to question practice. The ventilator care bundle has also given staff the awareness of having the patient head-up. As a unit, we have learnt that what we thought was head-up was not as head-up as we thought! Overall, our VAP rates and sedation costs have been reduced since the introduction of the care bundles.

The introduction of the CVC bundles has been easier to implement. These bundles have involved nurses at all levels. The nursing assistants who are aware of the bundles make up the packs. These packs contain a sticky label; this label is then placed in the medical notes so that compliance can be monitored. Overall compliance is high as all the equipment is in the bag. The sticky label acts as a guide for the medic staff. Nurses have the confidence to question the practice of the medics due to the implementation of these bundles. All medical staff are aware of all the bundles due to education from medical and nursing staff of all grades. Bedside nurses have the confidence to question if the CVC is needed.

Unit Benefits
Introduction of care bundles has helped highlight other areas where practice can be improved.

Introduction of Care bundles has helped foster better working relationships between nurses and consultants with regard to the introduction of new working new practices.

Introduction of a local Critical Care improvement program to evaluate current practices.

Generated an atmosphere of reflection and change amongst nursing staff

Developed new protocols and procedures as an off shoot of the current programme, e.g. introduction of a drug preparation protocol (amongst others) based on the best available evidence.

Personal Highs
The WCCIP has visited a turbulent plethora of emotive states upon me, some low, but a very many of them high.

Amongst the personal highs resulting from this programme:

Taking critical care outside the unit (Critical Care without walls!!).

Improved presentation skills

Learning (by my mistakes) to manage an ever increasing project, including developing leadership skills, time management (or lack of), negotiating skills, implementing audit etc.

Development of relationships with other Programme Managers and the staff at NLIAH

Experiencing the direct support of my Nursing managers, Nurse Consultant, Consultant staff, Clinical Director and the Chief Executive.

The Future
There are no crystal balls at Llandough but the WCCIP has shown us that improvement to patient care can be made easily (small improvements have big benefits), cost effectively, and with associated benefits to staff members.

With these thoughts the ‘Bundle team’ have earmarked the following:

• Improved Infection Surveillance.

• The Introduction of the Sepsis Bundle.

• Dissemination and roll out of the CVC bundle to theatres and wards.

• Establishing and implementing a multidisciplinary approach to weaning and the development of a weaning protocol.
Cross-site practices have been standardised due to the implementation of these bundles and although there is still a lot of work to go, these bundles have been successful in starting the process. Links have been improved amongst nurses between these units.

The project manager keeps all staff up to date with the daily and monthly compliance rates; these are posted on our notice boards. Regular updates with the project manager give us time to reflect on the previous months work, discuss problems that we have encountered and share our successes.

The regular learning events have been successful. They have given me the opportunity to increase my knowledge locally, nationally and globally. I have been able to meet staff from other units at all levels. This has given me the confidence to meet staff I would not normally have the chance to meet and discuss care bundles. These learning events have given me the confidence to liaise with senior members of my own unit. The learning events have given everyone the chance to meet like-minded staff who have a keen interest in improving patient care and carrying the momentum of the care bundles forward. The learning events have given me an insight into new initiatives from other units that can be taken forward on my own unit.

The Down Side

Of course, there had to be a down side. Any new change can cause upset on a unit. The unit in which I work has many staff and many new doctors; this of course can cause many problems with the implementation of any change. The P.D.S.A. cycles have helped in managing change but they may have been ambitious. Our increased knowledge has led us to try smaller P.D.S.A. cycles. An ongoing problem has been data collection. When to collect the data, how to collect the data, who collects the data. Due to regular feedback from the staff on the unit, it has led us to look at ways to improve data collection. The learning events have shown that it is a problem throughout most units. We are currently looking at a new format on how and when to collect data. Ensuring compliance is an ongoing problem i.e. ensuring the patient is head up, by utilising a P.D.S.A. cycle we are overcoming this problem. Managing data input with the constraints of the unit have proved difficult at times; a data input clerk would be invaluable.

The Future

Selling the product! Encouraging staff to collect data efficiently and effectively. Keeping the momentum going. Regular feedback for medical and nursing staff. Embedding care bundles into the culture of Critical Care.
Since the interim report the care bundle team at Carmarthenshire NHS Trust, have continued to go from strength to strength. Compliance with the both ventilator and central line bundle remains >95% in ICU and HDU in West Wales General and Prince Phillip Hospital. To date we have been unable to show any reduction in average ventilation time or length of stay, however we feel that high level of compliance demonstrated in our bundle baseline audit may explain why this is the case.

**On-going Projects:**

- Development of a weaning and restraint guideline to support the ventilator bundle.
- Introduction of the central line insertion bundle to Accident and Emergency departments and theatre in WWGH and PPH.
- Development of a caesarian section care bundle in midwifery.
- Development by physiotherapist of a tracheostomy bundle for use on general wards.

The immediate future will see the introducing the sepsis care bundle to critical care and general wards throughout the Trust.

It has been a privilege and rewarding experience working both collaborative with staff within the Trust and throughout Wales. The project manager’s day’s were extremely valuable and provided much needed support and guidance throughout the whole programme. Locally, I feel that this programme has raised the profile of evidence-based care and the importance of audit amongst junior staff as well as the whole team critical care team. Overall the team and I look forward with enthusiasm to the challenges of the new objectives of the Welsh Critical Care Improvement Programme.
**Care Bundles - Taking Patient Care To New Heights**

Marlize du Preez - Clinical Lead Physiotherapist, Sandra Miles - Professional Development Nurse for Critical Care, Critical Care Directorate

**Care Bundles**

- **Ventilator Care Bundle**
  - Airways Management
  - Suctioning
  - Breathing

- **Central Line Care Bundle**
  - Central Line Insertion Bundle
  - Central Line Maintenance Bundle

**Aim**

Improvement in Quality of Critical Care through the introduction of Care Bundles.

Promote National Collaborative Methodology in introducing change.

**Carmarthenshire NHS Trust - 2 sites:**

- West Wales General Hospital and Prince Philip Hospital comprising of 3 Critical Care Units, 18 Critical Care Beds.

**Multi Disciplinary Collaboration:**

- Medical staff
- Nursing Staff
- Infection Control Team
- Pharmacist
- Physiotherapist

**Future Developments**

- Tacrolimus Restraint Guidelines
- Meanings Protocol

**Monthly Compliance**

- Ventilator Care Bundle: Jan 100%, Feb 90%, Mar 80%, Apr 70%, May 60%, Jun 50%, Jul 40%, Aug 30%, Sep 20%, Oct 10%

- Central Line Insertion Bundle: Sep 100%, Oct 90%, Nov 80%, Dec 70%, Jan 60%, Feb 50%, Mar 40%, Apr 30%, May 20%, Jun 10%

- Central Line Maintenance Bundle: Sep 100%, Oct 90%, Nov 80%, Dec 70%, Jan 60%, Feb 50%, Mar 40%, Apr 30%, May 20%, Jun 10%

**Care Bundles..... Bundles of Care!**

**Welsh Critical Care Improvement Programme**

Sandra Miles, Professional Development Nurse for Critical Care.
Prior to starting the bundle it was decided to do a snapshot audit. The result of this audit was 100% compliance, which was extremely encouraging, as we had only just begun to look at sedation breaks. The ventilator care bundle was quickly introduced and implemented into our unit.

### Sedation Expenditure in ICU

The sedation expenditure for the pre and post ventilator care bundle has reduced since the introduction of sedation breaks. The two main sedations used are Propofol and Morphine, we however do use Midazolam but our usage is extremely small. Our expenditure for 2006-07 on both Propofol and Morphine has had a 30% reduction this year. This figure is based on expenditure and no other parameters have been investigated except for patient numbers, which remain constant to the previous 2005-06. Other factors will however be looked at.

### ALOS & ALVT

During the summer of 2006 we commenced an audit on our Average Length Of Stay (ALOS) and Average Length of Ventilated Time (ALVT). This revealed that our ALOS and ALVT were on average 3 days duration or below. However, during February of 2007 we had a long stay patient in Intensive Care which increased our figures to 6 days. Due to our small unit, any long stay patient can have a dramatic influence on our ALOS and ALVT.
Central Line Care Bundle (CVC)

The central line bundle was developed at the end of the project in 2007. Using a paper system we were able to pre-audit and review our practice. Our initial audit revealed a 94% compliance which was encouraging. Presently we are reviewing our local Trust policies with a view of some minor adjustments and looking to incorporating our Central Venous Catheter [CVC] surveillance data with the care bundle.

Personal Development

During the past year both myself and my deputy Ann Humphreys have enjoyed this learning experience and by having a deputy the continuity of the project has been able to be at the forefront in our unit. The programme has enabled us to improve leadership and teaching skills. The learning events together with the Programme Managers days have been both informative and inspiring. Communication has been one of the leading components in the success of these bundles not only in our unit but Trust and Wales wide. It is encouraging to know that the project will continue as it has now become an important link to standardising and improving care across Wales.

Future and Way Forward

The maintenance and improvement in compliance will continue to be monitored closely to achieve 95% and above. The central venous catheter surveillance is to be adapted into the CVC bundle so as to reduce duplication and excessive paperwork, which will eventually be incorporated into the intensive care patient charts. The continuation of the Welsh Critical Care Improvement Programme means we will be able to continue to develop the Central Line insertion bundle to both Theatre and Accident and Emergency departments. The introduction of the Sepsis bundle will also be introduced in the near future.

Thank You

It has been extremely rewarding to have been a part of this programme and the collaborative working with other units throughout Wales who have been a pleasure to work with.

May I take this opportunity to thank the Welsh Critical Care Improvement Programme team and Programme Managers throughout Wales. Personally, I would like to thank all members of our Critical Care team for all their hard work and enthusiasm over the last year.
Conwy and Denbighshire NHS Trust

Programme Managers: Linda Leech and Sue O’Keeffe

The Welsh Critical Care Improvement Programme’s (WCCIP) aim was to implement both the ventilator and central line bundles. At Conwy and Denbighshire the ventilator bundle had been in practice since July 2004 and the central line insertion bundle since January 2005.

The Trust was, and still is, involved in the first cohort of the Safer Patient Initiative (SPI). As part fulfilment for the SPI there was an expectation to implement both the ventilator and central line insertion bundle too. The initiative mandated that weekly monitoring of compliance and monthly outcome measures would be collated and reported.

Consequently, compliance of the bundles was already high and some tangible outcomes were beginning to be seen. What was a concern however was how the motivation and therefore compliance was going to be sustained?

The WCCIP provided the impetus to address two significant factors. Firstly, problems were beginning to emerge, especially in the ward environments, about the management of central lines post insertion and secondly, the excellent compliance with the current processes needed to be maintained.

Conwy and Denbighshire NHS Trust
**Central Line Maintenance Bundle**

The central line maintenance bundle was implemented, initially on ICU, and is presently being PDSA’d on a surgical ward (where problems had been sited) and in the renal unit.

The central line maintenance monitoring form has been slightly modified for each clinical area but maintains the same format in order for it to be transferable.

Despite being involved in the SPI and consequent infection control data collection for some time, difficulties continue to be experienced around infection control data and matching any cultures to the patient’s clinical condition in a timely fashion. Infection control and the ICU team are working jointly to resolve these issues.

**Sustainability**

The WCCIP has been pivotal in helping to maintain the sustainability of the two bundles compliance, especially because the practice development sister who originally implemented the bundles left ICU. Where compliance monitoring with the SPI had become much less frequent the demands of the WCCIP increased the monitoring frequency again and ensured that a ‘team approach’ involved all members of staff and promoted the sustainability by keeping the bundles profile high.

**Where are we now?**

It is over 2½ years since the ventilator bundle was introduced into daily practice.

Following on from its success the central line, sepsis and tracheostomy bundles have been implemented, a weaning and extubation guideline was designed and is utilised and daily goals are recorded during the multidisciplinary round.

Outcome data has been collated continuously but analysed at significant points post implementation e.g. six months, one year etc. Comparisons with previous equivalent time periods are also made to ‘compare ourselves against ourselves’. Our case-mix and staff have not changed significantly.

**Two Years Post Implementation**

What has been interesting is that change has not taken place overnight. Improvement has been a gradual process arguably, occurring where there has been a culture shift to enhanced partnership working.

The average length of stay (ALOS) on ICU has decreased by 2.7 days increasing the capacity for an additional 343 patients to be cared for in the ICU. Non-clinical transfers have reduced from seven to one and elective surgery cancellations, although still high, have reduced by 18.5%. Essentially, these level 2 and 3 patients are now being nursed in an environment appropriate to their needs. The severity of illness scoring, APACHE11, has not decreased despite the additional throughput; 17.3 vs. 17.4.
Pharmacy expenditure has decreased by £78,587 in total, compared to the previous two years. This equates to £14.40 per patient per episode. As yet an analysis has not been done to see where the reduction in costs is attributable to e.g. less sedation, fewer antibiotics or prompter conversion from intravenous medication or indeed, a combination of these factors.

Mortality has decreased too, from 21% to 17% in ICU and 29% to 24% for those patient discharged from ICU to the wards. Sadly though, ventilator associated pneumonia rates and catheter related blood stream infection data was not collected prior to the implementation of the bundles. Therefore there is no ‘pre’ data to compare with.

It is known that bundles provide a ‘forcing function’ for teamwork. This has been exemplified throughout the last 2½ years with nurses empowered to question practices outside the norm but also with medical staff having the confidence, and competence, to relinquish some of their decision making roles.

At Conwy and Denbighshire NHS Trust, as elsewhere, bundles have provided the vehicle to fuse ‘best practice’ into everyday practice.

The ‘All Wales’ WCCIP has been hugely beneficial from a networking and collaborative learning perspective. Without this programme there would not have been the relationships built and learning shared. Thank you to all.

The average length of stay on ICU has reduced from a mean of 5.6 days to 2.9 days – a reduction of a mean of 2.7 days despite matched Apache scores: pre 17.3 post 17.4.

This reduction in length of stay has created extra accommodation an additional 343 patients in the two years post implementation.

The Ventilator Bundle was implemented in August 2004. The Sepsis and Central line Bundles implemented in February and April 2005 respectively.

Patients no longer report nightmares or hallucinations, unlike their heavily sedated predecessors. Despite caring for 343 more patients in the post implementation period our pharmacy bill has decreased by £78587.

The average length of mechanical ventilation has reduced by a mean of 2.7 days and the number of patient requiring a tracheostomy has almost halved, arguably because of their daily sedation breaks.

Author: S O’Keeffe
Appendix I

Improving Quality of Care to the Critically Ill via a Care Bundle Approach

Gwent Healthcare NHS Trust

Programme Manager (Nevill Hall): Sylvia Ireland
Programme Manager (Royal Gwent): Sarah Beuschel

Nevill Hall:

Care bundles have allowed a uniformity of care to be introduced where previously the practice of care varied dependant on consultant prescription. Clinical engagement has been a key element in the change process, with care bundles now routinely included for all admissions, approximately per year. A cohesive multidisciplinary approach led by myself and Dr Stephen Edwards (lead consultant), with all other consultants and the unit’s senior nurse enthusiastically committed to the programme from the start. The majority of the nursing team viewed care bundles as a helpful guide to practice ensuring evidence based holistic care. Care bundles are also seen as a reminder/ check list for all staff. A minority commented that care bundles would increase their paperwork, while perceiving an extra responsibility toward the patients during implementation. All nursing staff are encouraged to remind junior doctors of the bundle elements, especially those elements which are over looked.

The rotation of junior doctors has proved a challenge as occasionally care bundles have been viewed as an infringement of their clinical judgement. With consultant help and support I have managed to influence any reluctant junior doctors to fully accept care bundles as part of our care.

Appendix I
The NLIAH funding has allowed me to plan one day per week (dedicated care bundle time) to coordinate and implement the change towards care bundles with education and communication viewed as a priority. Verbal and written communication included one to one, and group teaching. I have attended all directorate and unit meetings during this year allowing me to feedback progress and inform every one of any changes, appropriate review and action has followed on from daily audits of compliance.

We now have five bundles in place ventilation, CVC, tracheostomy, renal and sepsis. Each care bundle started off as a sticker for the ITU chart and after two months was transferred in to the individualized patient care plan.

### Ventilator Bundle - Start Date March 2006

As well as the four all Wales elements we at Nevill Hall include tight glucose control and a haemoglobin >7gm/dl. This allows continuity with the sepsis bundle.

During the first few weeks of this implementation it was identified that sedation scoring was not viewed as a priority by all nursing staff, therefore sedation holds were not being documented and managed appropriately. Individual audits of sedation scoring were carried out and staff given feedback with recommendations of regular sedation scoring for all patients based on their individual needs.

### Sedation Scores/24 Hours

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<th>4</th>
<th>5</th>
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<th>7</th>
<th>8</th>
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<tr>
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<td>9</td>
<td>9</td>
<td>21</td>
<td>8</td>
<td>9</td>
<td>10</td>
<td>8</td>
<td>6</td>
<td>9</td>
</tr>
</tbody>
</table>

![Sedation Score Graph](image)
Following on from teaching sessions on sedation holds the following algorithm has become part of our practice.

**Sedation Holds in Ventilated Patients**

**IS SEDATION HOLD APPROPRIATE**

- **YES**
  - Is the patient receiving a continuous infusion of sedatives?
    - Benzodiazepines
    - Opiates
    - Propofol
  - **NO**
  - Is the patient receiving muscle relaxants?
    - FIO2 < 60%
    - Peep < 2.5cms H20
    - Reverse I:E ratio
    - Or is prone positioned

**YES**

- Assess and document sedation score
- Reassess hours daily
- Continue hourly sedation score

**NO**

- Assess and document sedation score
- Reassess hours daily
- Continue hourly sedation score

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**Sedation Scores/24 Hours (continued)**

<table>
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<tr>
<td>Sedation Score</td>
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**Patient 2**

![Graph showing sedation score for Patient 2]

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</tr>
<tr>
<td>Sedation Score</td>
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</tr>
</tbody>
</table>

**Patient 3**

![Graph showing sedation score for Patient 3]
Appendix I

EXTUBATION GUIDELINES

The removal of an artificial airway from patients who have successfully been discontinued from ventilatory support should be based on an assessment of airway patency and the ability of the patient to protect their own airway.

1. Patient fits the criteria for trial extubation as per weaning guidelines

   YES

   IF NON

   Nurse-led weaning was introduced in March 2007 with unanimous backing from the Consultant. The proposed change was discussed with the Senior Nursing Team at their December monthly meeting, when the commencement date was set. The documentation and guidelines were explained in-depth within small groups across all grades.

   In its infancy, problems have arisen and unfortunately, nurse-led weaning has not as yet been totally adopted. As a consequence the guidelines have not been piloted effectively therefore, it is proving difficult to ascertain the possible causes and whether changes will need to be made to its format. Early indications are that the written protocol is conservative compared to the clinical practice of our clinical body.

   Building upon the nurse-led weaning it was identified that there was a natural progression to include a nurse-led extubation algorithm within the guidelines. Further teaching and promotion is indicated, to ensure nurse-led weaning can reach its full potential.
CVC Bundle - Start Date May 2006
This has been implemented with the empowerment of nursing staff and the support of consultants and has been relatively easy change to undertake. We already used one dedicated lumen for TPN; the only big change for us was to document the daily assessment of need.

Networking outside critical care into Accident & Emergency, Coronary Care and the general wards has allowed me to work closely with outreach and the nurse practitioners in the implementation of the sepsis bundle. This approach has increased the unit’s admissions of sepsis patients who were identified and resuscitated at ward level.

Sedation costs are now reviewed regularly although due to the increased use of remifentanil our costs have not decreased.

We have seen an overall reduction in our length of stay; however this is not all due to care bundles and does include variances such as delayed discharges etc:

Compliance with all bundles remains constantly at 96-100%

Personally I have grown in confidence during this year. I am now able to present to large audiences and teach on the Foundation in Critical Care (degree module) based at Gwent Healthcare. I now feel comfortable feeding back to all parts of the multidisciplinary team and regularly liaise with consultants outside critical care. My computing skills also have increased ten fold.

The success of the programme at Nevill Hall has been based upon my flexibility at working across directorate and professional boundaries. I have received support from my lead consultant, senior nurse and the rest of the critical care team. I have also been empowered by their belief in my ability to lead this project.

This project at Nevill Hall has been facilitated by a small team of nurses (the bundle girls) who have taken on the task of the daily audits. I have also been supported by excellent administrative staff to who I would like to give special thanks.

Future Plans
Start the next year with as much enthusiasm and commitment as this year
I plan to revisit all care bundles and reinforce teaching across all disciplines
Continue with nurse led weaning
Commence the mandatory infection surveillance
Work closely with outreach and implement the CVC bundle outside critical care into the general wards and theatres
Spend more time on the wards promoting the sepsis bundle
The Welsh Critical Care Improvement Programme (WCCIP) has been an interesting and exciting project that has been an honour to be involved in.

The programme’s aims were to implement two care bundles, ventilator and central venous catheter with a greater than 95% compliance rate in every general intensive care unit across Wales.

This has been achieved in the Royal Gwent Hospital by hard work, a variety of change management techniques and dedication from the whole team and has been a resounding success. The two bundles are now in place and part of normal everyday practice, compliance is predominantly greater than 95% and any problems are identified and resolved.

However we have achieved so much more as a result of this programme:

A Critical Care Innovation Group now meets regularly between nursing and medical staff to discuss any proposed new initiatives and to establish views and hopefully a consensus on how to develop them.

A nurse led weaning protocol is now being implemented and modified to ensure it is a functional tool for all members of the multi disciplinary team.

Sedation scoring has been audited to establish why staff members were not completing the sedation forms and a questionnaire has highlighted a practical tool that the majority of staff are happy to use.

Sedation expenditure is now inspected regularly to determine if there have been any improvements in cost. A reduction in cost is not evident as yet but it is a practice we will continue as it may be premature to establish an overall improvement.

The central line bundle has empowered members of staff, particularly on HDU which is a Surgical/ Medical led unit, to be able to ensure that central lines are not kept in for longer than is absolutely necessary. This now enables nursing staff to remove central lines without having to wait unnecessarily for a ward round or call back from the medical teams.
Personal Development

As a result of WCCIP, I have developed an increased understanding of advancements outside of the critical care unit and Royal Gwent Hospital.

My presentation skills have improved considerably as a result of the training from the NLIAH staff. The progression of my poster presentations can be seen in the two posters I submitted for this programme. I also presented at the celebration event which was a challenge as I did not have the confidence previously.

My computer skills have improved dramatically since commencing this programme, with assistance from my manager I can now create an Excel spreadsheet and extract information from the spreadsheet, my PowerPoint and database skills have also progressed.

I also have an increased expertise in the process of change management and have discovered that there is a need to use different styles to be to achieve results. I have also realised the importance of sustainability and ownership to ensure that the change is permanent.

The formation of a critical care nurse network has been one of the greatest assets of this programme in my opinion. There has been a sharing of ideas, support network and ability to benchmark with other units. The sharing of protocols, databases, forms and paperwork has ensured that so much more has been standardised, not just the care bundles themselves.

I have a better appreciation of what is occurring outside of the Trust and Critical Care. I have become involved in infection surveillance on a much wider scale and am aware of the WHAIP, Welsh Assembly Government project.

Royal Gwent Hospital is part of the Safer Patient Initiative Project (phase 2) which is funded by the Institute for Healthcare Improvements (IHI) and it was beneficial to already have an understanding of the IHI prior to learning of our involvement.

Future Developments

We plan to cascade the central line bundle out to the wards with the support of the Outreach Team.

The weaning protocol will continue to be developed and the change management skills we have acquired can be used to achieve a working protocol.

The next bundle to implement on the critical care unit will be the management aspect of the sepsis bundle and once established to introduce it to the wards and A&E.

There will be a process of succession planning, whereby I will handover to someone who has the motivation and enthusiasm for care bundles, who is prepared to commit to the project could benefit from the support and expertise of NLIAH and being part of a network.

However I would hope to and want to continue to be an active and key member of this very successful project.

I would like to take this opportunity to thank everyone who supported me through the development of this programme. It certainly is not the final story.
Appendix I

CARE BUNDLES—THE FINAL STORY
ROYAL GWENT HOSPITAL—Gwent Healthcare NHS Trust

JUNE 06: The Ventilator bundle established — Compliance goal initially.
AUGUST 06: Dip in motivation.
SEPTEMBER 06: Compliance charts presented to the staff to highlight positive aspects and areas for improvement.
DECEMBER 06: Motivation improved with staff awareness.
Audit collection accomplished by enrolling the shift leaders.
JANUARY 06: Sedation hold compliance dropped, identified and addressed using PDCA.
FEBRUARY 06: Compliance improved.
JANUARY 06: Continuous decision regarding aspects of implementation — M&T Innovations group.
FEBRUARY 06: Central Venous Catheter Bundle launched.

Insertion bundle aspects not complying addressed with medical teams.

PERSONAL OPPORTUNITIES
- Networking and sharing with other teams within Wales.
- Developing Change Management Skills.
- Developing Presentation Skills.
- Increased awareness of all Wales Developments.

Special thanks to Linda Alexander,frog Gutter, Jenny Griffiths, Dr Myles, Dr Stephenson and Liz Whitley as well as all of the staff of Critical Care Unit.
Royal Gwent Hospital for their support and hard work.
Sarah Beafield

The past year has seen a resounding success within the North East Wales Trust (NEWT) with the implementation of the ventilator care bundle in ITU — with compliance figures consistently exceeding 95%.

The Central Venous Catheter Care Bundle
The CVC care bundle has been more complicated to implement due to its multi faceted elements i.e. two components and not just restricted to the critical care area. Baseline data showed that not all the elements were being complied with on a daily basis.

The decision was made early on to commence the insertion bundle in theatre, as this is where the majority of lines are inserted. Documentation has been a particular problem when capturing this information, so after many tests of change a form was devised so that it followed the patient from theatre through onto the unit and was completed once the line was removed.
Appendix I

As part of our strategic framework to address this, the group have devised an action plan for overall delivery of the CVC care bundle:

THEATRES - The central venous catheter care bundle has been introduced to Theatres since November 2006.

CORONARY CARE UNIT/MHDU - The Coronary Care Unit began implementation of the process in February 2007 following education delivery. The acute medical physician is a keen champion for this process.

RENAL UNIT - The renal unit have shown considerable interest in the education programme for the CVC care bundle and teaching sessions are being planned for May 07 with a view to implementing the bundle for acute line insertion of renal lines and general ward maintenance.

ACCIDENT AND EMERGENCY - A+E are currently looking at a pre-audit analysis of CVC insertion and educational sessions will begin with casualty staff in June 07.

TRUST WIDE - a trust-wide programme for the central venous catheter maintenance bundle will follow this.

Length of Stay

Length of stay has shown very little decrease that can be contributed to the care bundle process - since the commencement of the care bundles there have been elements of long stay patients and the variable case mix e.g. trauma, post operative, medical and surgical emergencies.
This will be continued to be monitored as a measure not only for the Trust but WCCIP and the Safer Patient Initiative.

There has been a lack of consensus on what constitutes a ventilator-associated pneumonia and therefore no baseline data exists. Current work with the Safer Patient Initiative will hopefully overcome the issues with definition.

Barriers, Breakthroughs & Learning

<table>
<thead>
<tr>
<th>BARRIERS</th>
<th>Initial clinical engagement was slow but with the assistance of a clinical champion in the form of our clinical lead the situation has improved as the programme has developed.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Documentation</td>
<td>As is often the case, documentation continues to be a major issue. However with the careful use of tools and techniques (e.g. PDSA methodology) we have been able to overcome this barrier in many areas.</td>
</tr>
<tr>
<td>BARRIERS</td>
<td>Continuous feedback to critical care staff and the improvement of compliance rates especially those of the ventilator care bundle have contributed towards the motivation for clinicians to engage in the process and thus reducing many of the barriers.</td>
</tr>
<tr>
<td>Networking</td>
<td>Networking between Trusts and other departments has been invaluable. It is essential for us as a group that this continues. The programme for NEWT has now moved from ‘Project focused’ to being our ‘core business’.</td>
</tr>
<tr>
<td>LEARNING</td>
<td>It has been clearly evident that the value of giving feedback to all staff at each stage of the project is invaluable. Many of the processes that have been utilised were in place before commencement of the SPI 2 initiative, which has stood us in good stead for contributing to this initiative.</td>
</tr>
</tbody>
</table>

Next Steps

In addition to these strategies it is envisioned that the dissemination of improvement efforts will continue throughout the Trust. In order to enhance this we aim to continue monitoring central line infection rates and VAP in conjunction with SPI 2. Overall, new and revisited initiatives will include:

**NURSE LED WEANING POLICY** - Prior to the WCCIP the development of a weaning protocol was well underway, following ratification from the Directorate Management Team we aim to begin the implementation of the guidelines in August 2007 this will add considerable support to the ventilator bundle.

**WHAP** - to support of infection surveillance by utilising the CVC care bundle.

Teamwork has been a vital element for the success of the programme as well as the dedication and commitment to quality patient care through the use of the care bundles.
The Ventilator Care Bundle
A baseline audit of compliance with the ventilator care bundle from the beginning of April revealed consistent use of DVT prophylaxis and GU prophylaxis, variable practice with head elevation, but no provision for daily sedation interruption.

Even though a more gradual introduction was advised, it was decided to implement the whole of the ventilator care bundle simultaneously on May 22nd 2006, as the intensive care unit was quiet with only four ventilated patients during the first week.

The ventilator care bundle was rapidly and successfully implemented due to a combination of initial low bed occupancy which allowed for ease of introduction and the empowerment of nursing staff in ensuring overall compliance facilitated by an already existing desire to change and improve the use of sedation.

A three-month period was planned for the exclusive implementation of the ventilator care bundle before introducing the central venous catheter care bundles.

The Central Venous Catheter (CVC) Care Bundle
After conducting a baseline audit of compliance with the CVC maintenance care bundle in July and August 2006, it was clear that compliance was low in terms of aseptic lumen access, use of a dedicated TPN lumen and daily assessment of catheter need.

A baseline audit of catheter insertion was not conducted but the elements of the care bundle were already established as standard practice.

Following two weeks of designing revised and new documentation, education and awareness through presentations and discussion with staff, the central venous catheter care bundles were implemented in full on 4th September 2006.

The CVC care bundles were again rapidly and successfully implemented through empowerment of nursing staff, and a progression of the care bundle concept which had already delivered visible benefits.

Data Collection
The concept of daily collection of detailed audit data was a new experience for everyone at North Glamorgan Intensive Care Unit. The original documentation has been revised several times during the year due to increase of data and to improve ease of use.

At the outset of the programme, it was agreed that the senior nurse in charge of the unit each day would have responsibility for overseeing practice and recording the daily compliance data. This has proved to be very successful in improving practice at the bedside and ensuring that compliance with data collection has been consistently 100% throughout the year.
Below are the results of data audit of average length of ventilator time and average length of stay for the period May 2006 - March 2007.

The graph demonstrates a distinct correlation between the average length of ventilator time and average length of stay.

There is a marked reduction in average length of ventilator time in June following the introduction of the ventilator care bundle.

The figures for average length of stay were heavily influenced by the delayed discharge of numerous patients during the summer/autumn of 2006, with the hospital wards being generally busier than normal for the time of year.

During the same period, the unit had an unusually high number of critically ill septic patients resulting in increased ventilator time.

The expected winter variation is clearly apparent, with the intensive care unit working at a relentlessly high occupancy since December 2006.

The patient case mix during the winter has also seen high numbers of critically ill, chronically sick patients who have been admitted with pneumonia and/or sepsis and subsequent renal failure, necessitating prolonged periods of ventilation and intensive care.

The audit of ventilator-associated pneumonia and catheter-related bloodstream infection rates over the past year is ongoing, and as such, no figures are currently available.

This is mainly attributable to the considerable time constraints involved in combining the roles of WCCIP Programme Manager and clinically based Ward Manager.
**Programme Successes**

The first year of the Welsh Critical Care Improvement Programme has been an undoubted success at North Glamorgan NHS Trust, for me personally, for the intensive care staff as a whole, and ultimately for the many patients who have required intensive care over the past twelve months.

**Team Development**

At a local level, empowering nursing staff to implement change and sustain improvement through WCCIP has been a significant development, and has proved what can be achieved in a relatively small timescale.

The culture of challenging traditional medical and nursing practice through evidence-based research is a development undoubtedly accelerated by the methodology of this programme.

An intensive care forum was established early in the programme to ensure regular meetings between senior anaesthetic staff, myself and the clinical nurse manager, with the intention of driving forward change together through discussion and protocol development. Unfortunately, organisation of these meetings has been problematic, but hopefully can be resolved this year.

With the requirement for regular audit regarding ventilator-associated pneumonia and bloodstream infections, and the forthcoming surveillance programme, there has been a considerable improvement in the working relationship between intensive care and the infection control department.

**Financial Benefits**

There has been a considerable impact on intensive care pharmacy expenditure at North Glamorgan NHS Trust when comparing April 2005-06 with April 2006-07, following the implementation of the Welsh Critical Care Improvement Programme.

**Personal and Professional Development**

WCCIP has provided me with a first opportunity in project management, with local responsibility for planning, organising, co-ordinating and managing a significant national improvement project in critical care. This has been accompanied by further development of skills in presentation and report writing as well as a raised personal profile within the trust.

As a member and contributor to an all-Wales Programme Manager network in critical care, my knowledge and awareness of National and Strategic Health Policy both generally and in relation to critical care has increased significantly.

I have participated in the strategic decision process through membership of a critical care working group examining the future of critical care services in the local area, and have recently been nominated as the trust critical care representative for the Intravenous Devices Group for Welsh Health Supplies Contracts.

**Patient Care**

The care bundles have provided standardised, consistent, evidence-based care for all patients who are ventilated and/or have a central venous catheter, using guidelines which have been widely accepted locally and nationally.

The traditional culture of over-sedation was broken very quickly, and has led to many more patients being managed on ventilators with little or no sedation. In addition, and when appropriate, patients are generally weaned from ventilators more quickly.

The programme has coincided with a trust policy regarding central venous catheter insertion, which ensures medical staff receive training during their induction process. Intensive Care, Accident and Emergency and Coronary Care now have ultrasound devices for guidance during catheter insertion, and ward patients requiring central venous catheters have the procedure performed in a theatre anaesthetic room.

In the Intensive Care Unit, greater attention is paid to aseptic access of central venous catheters, a dedicated lumen for TPN is now general practice, and regular assessment of need has resulted in early removal.

**National Collaborative**

This year has resulted, for the first time, in the successful formation of an all-Wales network of critical care nurses, having a common goal and the desire to work together and provide support to promote positive change and improvement nationally.

The Programme Manager days have proved to be an invaluable forum for the excellent training provided by NLIAH, sharing experiences and ideas throughout the year, and as a means of support and encouragement, which has been greatly appreciated.

The Learning Events have provided an opportunity to introduce colleagues to the context of WCCIP outside the local units, to put an all-Wales perspective on the programme, and to meet critical care colleagues both professionally and socially.
The programme has been very much nurse-led in terms of organisation, teamwork and improvement at the bedside, and has been successful due to a desire to improve patient care, willingness to embrace positive change with visible results, and perseverance to maintain high standards through difficult circumstances.

The Future of Care Bundles at North Glamorgan NHS Trust

The Welsh Critical Care Improvement Programme moves into a second phase in April 2007, with a proposed third phase in April 2008 as part of the Welsh Assembly quality agenda.

The first objective is to consolidate and continue the work of the ventilator and central venous catheter care bundles within the Intensive Care Unit.

The central venous catheter care bundle will hopefully be introduced to Theatres, Accident and Emergency, and Coronary Care Unit early this year, with initial contact between myself and senior colleagues in these areas encouraging. This will be followed by a trust-wide programme for the central venous catheter maintenance bundle.

The forthcoming Welsh Healthcare Associated Infection Programme (WHAIP) of surveillance for central venous catheters will provide feedback on infection rates. Preparation work is under way to introduce the Surviving Sepsis Campaign care bundles into the intensive care unit, prior to a proposed trust-wide programme.

It is hoped to involve the Infusion Devices and Resuscitation Teams in the next phase of the programme, as they have already expressed an interest in care bundles, and have access to staff across the trust through training.

The improvement team in Intensive Care will be expanded this year, with the possibility of introducing other care bundles for the management of tracheostomies, nutrition, head injury and renal failure.

Personal Thanks

To Dave Hope, Chris Hancock, Dominique Bird and the NLIAH team for the leadership, organisation, training, support and encouragement they have provided during the past year.

To Noel Rowley, Lead Nurse at Morriston NHS Trust, for the database he allowed me to use and adapt, which has been invaluable in collecting compliance information.

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The ventilator care bundle has directly impacted on the costs of Midazolam and Morphine, the principal sedative agents used for ventilated patients:

- Midazolam expenditure has been reduced by 41%
- Morphine expenditure has been reduced by 35%
- Propofol expenditure has been unchanged
- Xigris (Drotrecogin alpha) expenditure has been reduced by 33%

It must be noted that Xigris cost reduction is also attributable to factors other than the introduction of care bundles, namely patient eligibility according to treatment criteria. However, patient numbers, case mix and consideration were considered comparable.

The total cost saving for the above drugs alone has been £18,700 in the past year.

The total funding received by North Glamorgan NHS Trust in April 2006 was £10,000.

The actual programme expenditure for the period April 2006-07 was £4002.79, or £6485.95 accounting for the theoretical cover of staff hours at the Learning Events.

Summary

The Welsh Critical Care Improvement Programme evolved at an ideal time at North Glamorgan NHS Trust Intensive Care Unit, as it provided the means to deal with several patient care issues already being questioned and examined.

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Prescribing DVT and stress ulcer prophylaxis was readily accepted; the sticking points were patients slipping through the net. The Care Bundle approach was not an entirely new concept to ITU at Ysbyty Gwynedd in March 2006 when the programme started; in theory we already had the ventilator and sepsis care bundles running. However, an audit at the beginning of the year demonstrated poor compliance. The challenge was to convince the ITU team of the benefits to the patients so that we were compliant as near to 100% of the time as possible, to stop patients slipping through the net.

The first step was to form a strategic team involving as many members of the multidisciplinary team as possible. We had participation from nurses, physios, anaesthetists, dieticians, pharmacy, infection control, outreach, audit department, modernisation department and a patient representative. The large team has improved communication between different members of the MD team and also meant that care bundles have had a high profile within the hospital.

The Ventilator Care Bundle

An education programme was started that aimed to target every single anaesthetist and nurse within the department which involved formal teaching, bedside discussions, coming on night duty to teach the night staff and doing talks at doctors meetings. A page for the hospital intranet was developed and a resource file made for every bed space. To assist with communication we also started a daily ward round between anaesthetic team and nursing staff. A daily multidisciplinary ward round was agreed to in principle but has proven impractical at present.

Prescribing DVT and stress ulcer prophylaxis was readily accepted; the sticking points were 30 degrees head up and sedation holds. Better compliance has been achieved by education and persistence.
To complement the ventilator care bundle a nurse led weaning protocol was developed (with the help of Swansea) with the aim of reducing average ventilator time. This has been a big cultural change as traditionally nurses on the unit have not adjusted ventilator settings.

The Central Line Care Bundle

Once we had achieved good compliance levels with the ventilator bundle we tackled the central line maintenance bundle. The main change to practice was early central line removal. This was surprisingly well received and the only negative feedback was from the night nurse practitioners who complained that they kept being called to the wards to insert venflons on ex ITU patients who were no longer being discharged with central lines. The average dwell time for central lines has been reduced by approximately 2 days. The insertion part of the bundle has just been started, the delay being due to having a drape and insertion pack being specially made for us as we had neither. We continue to monitor central line infections with the hope of trying to reduce them now that the bundle has been started.

The Sepsis Care Bundle

The sepsis maintenance bundle was already implemented, and compliance with every element has been good except for tight glucose control. This is an area that we want to concentrate on in the coming year. A&E are in the early stages of implementing the sepsis resuscitation bundle, with support from ITU.

Taking Care Bundles to the Wards

We have a roll out programme for the wards to implement the central line bundle. Feedback from the first ward is very encouraging, where medical and nursing staff think that bundles are a great idea and are very keen to get started.

Benefits of the Programme

Although at NWW we have not been able to demonstrate a reduction in ventilator time or length of stay by implementing care bundles, the unit has benefited greatly from involvement with the programme.

- Nurses now practice with more autonomy as they are able to wean and remove central lines without consulting medical staff.
- Data collection and infection surveillance has become a normal part of the unit’s activity.
- We are more aware of developments on a national level and have been able to borrow ideas from other hospitals.
- Patients receive evidence based care.

On a personal level, I have learned a great deal about change management and improved presentation skills. I would like to thank NLIAH and all the Programme Managers for their support and the enthusiasm from all on ITU at Ysbyty Gwynedd.

Pembrokeshire and Derwen NHS Trust

Programme Manager: Linda Horswill

In May 2006 Pembs & Derwen joined the Welsh Critical Care Improvement Programme along with fourteen other critical care sites across Wales. This report reflects on our Unit’s achievements over the last year, the progress we are making and how we plan to sustain the improvements made.

At the start of the programme within our intensive care unit most of the medical and nursing staff had no pre-existing knowledge of care bundles and also the nursing staff had little experience of clinical audit. A project team was established and clear aims and objectives were set using the PDSA cycle format. A baseline audit was undertaken, simple audit tools were developed and a programme of education commenced.

Our aim at the start of the programme was to implement the ventilator and central line bundle and meet the set target compliance of 95% or above on a consistent basis.

The ventilator care bundle was implemented in July 2006. Initially there was some confusion and inconsistency around the sedation element of the ventilator bundle but with further clarification this has long since been resolved and as a result we are consistently achieving 95% and above compliance and this is encouraging.

In addition the ventilator weaning policy, which had previously been introduced into the Unit, but rarely used, was now revised and implemented again as a natural progression to the sedation element of the ventilator bundle.
Appendix I

Central Line Compliance

Coping with Change

As with any culture change it takes time for any new change process to become an established norm. Since the beginning of this year the ventilator and central line care bundles have become fairly well established and clinical audit of the practice is now much more routine.

Future Plans

Work is already underway on our next objective, which is to implement the sepsis bundle, and it is envisaged that the central line bundle will be disseminated to theatres, A&E and some of the medical and surgical wards in the near future. Further projects will be to introduce other bundles, such as, tracheostomy, enteral feeding and tight blood glucose control.

Evaluation

Intuitively care bundles feel right, and local audits and evaluations are beginning to demonstrate the benefits. In our own unit information sharing and working collaboratively with other critical care staff across Wales has been a positive and rewarding experience. Nursing staff have an increased awareness of audit, data analysis and infection control surveillance, and each individual patient’s care bundle encourages communication between anaesthetists and nursing staff. Since implementing care bundles in our unit we have seen a change in our nursing practice and we welcome the improvements to the quality of care we now deliver.

The project team at Pembs & Derwen would like to thank NLIAH and all those involved with the WCCIP for their support and enthusiasm throughout the duration of the programme. We feel proud of our achievements over this last year and look to continue with the same enthusiasm and commitment in the future.
Appendix I

Project Team
Linda Horswill Project Manager
Dr. R Griffiths Lead Clinician
Alison Howells Sister
Julie Wickland Sister
Juddah David physiotherapist
Dr Kanakaraj anaesthetics
Dr Ranjan anaesthetists
Dr Chandra anaesthetists
Sue Richards specialist nurse infection control
The programme has now been running for one year within the Critical Care Unit at the Royal Glamorgan Hospital. The two care bundles that were implemented by the Welsh Critical Care Programme in March 06, Respiratory and CVC have now been successfully integrated into the working practices of the Critical Care Unit at the Royal Glamorgan Hospital.

Initial problems to start with of providing the staff with training and education of the care bundles have now been resolved after the building of a very good team within the department who are committed to the implementation of the initiative.

There has also been the development of releasing a member of staff to chase up the care bundle data and input it into the computerized database so that gives the department the ability to track how well the care bundles are progressing.

The work that has been done within the department has been very progressive over the year and it is exciting to see how the care bundles have been taken on and utilized for the benefit of the patient. The Programme Manager has found the work and implementation of the care bundles very difficult initially but progressively over the year this has steadily improved as more staff have been keen to take part in the initiative.

From the utilization of the respiratory care bundle and allowing the patient a sedation break there has been a small reduction in the amount of usage of propofol and alfentanil.
Appendix I

Ventilator Care Bundle
The Ventilator Care Bundle, launched as part of the WCCIP, was introduced with the Basic Care Bundle. Both these bundles are now a part of each nurse’s daily routine. The checking of cuff pressure every shift was included as an extra component in addition to those agreed by the WCCIP. Even though this was not included in the National Care Bundle, we felt its importance was significant enough to include as a local variation within the Ventilator Care Bundle.

Central Line Care Bundle
The Central Line Care Bundles were introduced to the Critical Care Department during autumn 2006. The purpose of this bundle was to standardise the insertion of central lines and ensure daily maintenance of the central lines. The infection data, i.e. catheter related blood stream infection rates, are collected and monitored in co-ordination with the Welsh Associated Infection Programme (WHAIP). Data collection with this bundle has been inconsistent, possibly due to the large number of nursing and medical staff needed to educate regarding the bundle. The geography of the two sites is difficult to monitor. By the time data is required for the national surveillance, it is hoped staff will be more familiar in completing the forms.

Weaning Protocol
A nurse led weaning protocol has been developed, piloted and is now implemented into the department. This is intended to reduce the length of time patients are on ventilators.

Swansea NHS Trust

Programme Managers: Noel Rowley & Bethan James

Swansea NHS Trust - Launch
In March 2006, the ‘All Wales Journey’ was commenced in Swansea NHS Trust with the implementation of a Basic Care Bundle and a Ventilator Bundle. Early introduction allowed more time to establish the concept of Care Bundles and identify any problems prior to the National launch. A poster was devised to summarise our actions.

Basic Care Bundle
The introduction of the Basic Care Bundle was devised by the Critical Care Department in Swansea to ensure all patients, ventilated or not, received standardised interventions. These included DVT prophylaxis, tight glucose control, feeding protocol and administration of Folic Acid.
The purpose of the group is to look at areas of practice and if required to implement changes in the way we work. The Care Bundle data is analysed and changes are made to strive for 100% compliance. Our target is to ensure each patient receives all the interventions they require every day. The group meets every three months.

As a result of the group, there have been benefits in improved continuity of care for long term patients, with better liaison between medical staff, nurses and the physiotherapists regarding rehabilitation. A multi-disciplinary policy was drawn up which involved standardising bedside folders and regular discussion of long stay patients at our weekly multi-disciplinary meetings.

Each patient over ten days would be allocated a designated lead consultant, nurse and physiotherapist whose role is to co-ordinate and communicate the overall care of the patient. The consultant’s timetables were reviewed to maximise continuity of patient care. It was agreed that the consultant admitting the patient would be allocated as their lead consultant. The nurses were allocated depending on their experience and availability over the following few weeks. All multi-trauma patients were included in the programme immediately.

Communications between the multi-disciplinary team with patients and relatives has been addressed with the help of our patient/public representative. Written information in the form of patient leaflets have been updated and now distributed to relatives when patients are admitted to the Unit. A survey of relatives’ satisfaction and communication needs is currently being undertaken.

A valued member of the group is Liz Savage our Patient/Public representative. Liz has attended all our meetings and has written a short summary of her involvement within the group:

“My involvement in this programme started as a result of a meeting with Noel Rowley to discuss a problem experienced in the nursing care of my mother while in ITU during summer 2006. I was asked to attend the Improvement Group meeting held on October 25th 2006 and have attended the two subsequent meetings.

I am very aware of my limited knowledge and experience of hospital procedures and medical and nursing terminology so I prefer to listen to discussions and only make a contribution, ask a question or give a point of view when the subject is relevant to the general public and relatives of patients in particular. However, my experience as a teacher has afforded me some understanding of how public organisations work.

All members of the group have been supportive, welcoming and professional and are open to my opinions, willing to listen as well as explain.”

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I have been asked to collaborate on two specific projects:

- a survey to assess the level of relatives satisfaction with communication with ITU staff.
- the revision of the written information about ITU given to the relatives of new patients.

I have also met with Moyra Griffiths, Patient Experience Manager, initially to discuss training for representatives like me, which does not at present exist, and then to discuss any other ways in which I can be of help. She will keep me informed of future initiatives and meetings, including those of the Editorial Board and audits of different departments.

I have to achieve a delicate balance between asking questions which can stimulate a different way of thinking and interfering in clinical discussions. I hope to gain confidence in this role.

I would also like to receive training and discuss our role with other public/patient representatives in Swansea NHS Trust and nationally.”

Elizabeth Savage 30.03.2007

The Future

Our aims for the future

- To increase the care bundle compliance above 95%.
- To implement a system to enter data directly onto a computer at the bedside.
- To introduce nurse led extubation within the weaning protocol.
- To improve on the multi-disciplinary reviews for our long term patients, facilitated by the use of the continuity of care forms.
- To feedback on the relatives survey on patient communication and satisfaction.
- To implement the severe sepsis bundle, linking in with an outreach service to allow early recognition and treatment of septic patients on the wards.

The team in Swansea NHS Trust would like to thank everybody for their help and support in the project and look forward to another successful year.
Trained the practitioners involved in the placement of the catheters concerning the elements of the bundle that had to be implemented.

Trust wide information sharing, ensuring that staff were aware of the project.

Devised a spread sheet in the CVC insertion clinic where data could be entered after each placement with a clear indication on the exclusions taken.

**Patient Representative**
A patient representative was involved from the onset and expressed his views from the patients’ perspective.

**What change came about as a result of this project?**
The bundle has improved our practice in general in that we now use full body draping and pay more attention to the preferred site for placement. Chlorhexidine solution is now used for all CVC placements.

**Results**
There was a 100% compliance rate from the onset and this was maintained throughout.

**The Future**
We aim to introduce further bundles into our practice in Velindre, namely the sepsis bundle which will be adapted to non-critically ill patients. Our CVC infection surveillance will take place along side the bundle.

**Velindre NHS Trust**

Programme Manager: Meinir Hughes

Velindre NHS Trust is based in Cardiff and provides specialist services at a local, regional and all Wales level. The Trust comprises of many Divisions, one being Velindre Cancer Centre. The Cancer Centre specialises in the care of patients with cancer and is committed to ensuring quality standards of care for our patients.

The Cancer Centre does not have a critical care unit within the hospital and our involvement in the Critical Care Improvement Programme was to introduce one care bundle into our daily practice. There are many Care Bundles being introduced into the critical care settings throughout Wales as a result of this project, however due to our patient group we could only implement the CVC Insertion Bundle at Velindre Cancer Centre.

Around 400 PICCs are placed annually in Velindre and 100 Hickman catheters. Both devices are crucial in the treatment of our patients to accommodate the delivery of intravenous therapy. The CVC insertion bundle was successfully introduced into the PICC and Hickman placement clinics in May 2006 and has been successful throughout the year.

**How did we go about it?**
The team involved: Doctor, Senior Nurse, Intravenous Access Specialist and patient representative collectively agreed on the process and the way to implement the project.

Wrote an information document to inform the relevant practitioners of the concept of Care Bundles.

Amended the bundle to include our own local exclusions.
Appendix III

Executive Summary from Programme Evaluation

In order to gain insight into the impact of the collaborative approach telephone interviews were held to capture Senior Nurse, Sister, Charge Nurse and medical views of the programme. Face to face interviews were held with the Programme Lead and Clinical Lead to establish their roles. All relevant documentation was reviewed and an extended focus group held with key Trust staff involved in the implementation of the programme.

Strengths of the Approach

NLIAH has achieved successful collaboration through empowerment and ownership by making this a clinician led initiative which provided clinical credibility, understanding of the issues and motivation to succeed. It seems that collaboration is the key to successful implementation of change. Failure to incorporate it within the WCCIP could have resulted in the ultimate rejection of this opportunity to improve care delivery for adult critical care patients.

Many of those involved in the Programme argued that the greatest single achievement was the creation in every Trust of a culture which valued routine monitoring of selected key aspects of service delivery, and acting on data generated therapy.

- Compliance figures for September 2006 show that Trusts achieved around 90% compliance for the care bundles with only one Trust falling below this. This is representative of the success of the WCCIP approach.
- The impact of the fact that care bundles are here to stay has assisted in gaining cooperation of all involved. The care bundles are seen as a means to achieving best practice, quality and standards of nursing/medical care for patients and for these agreed standards to be met regardless of which Critical Care Unit the patient is admitted to in Wales.
- The work of the local Programme Managers was a key factor in ensuring professional engagement, and their own clinical credibility was central to this.
- Integration into practice required the ability to overcome resistance from some doctors and nurses through discussion, debate and education. There will always be some debate over the quality of evidence used to change practice and incorporated within the care bundles, but a key point with the WCCIP is that the care bundles will evolve and require review if new evidence is identified.
The collaborative methodology of the WCCIP has provided a stimulus for an All Wales approach and national debate with the growth of Critical Care Networks and an integrated approach to care bundles in clinical practice. It is envisaged that the WCCIP has set in motion a foundation for an open culture of sharing and learning on an All Wales basis and that this process will continue with future developments such as the implementation of the Sepsis Care Bundle and identification and dissemination of new care bundles as the process evolves.

Recommendations

• It was noted that better use could be made of the Local Improvement Groups to facilitate and negotiate the needs of Programme Managers and logistics of delivery. This could also improve the perceived gap regarding Trust Executives and management engagement in the process.

• Time for the Programme Managers needs to be protected at one day per week and that their roles should not be seen as having someone extra on duty to rely on if it gets busy. Appropriate PR and marketing needs to be implemented in conjunction with the start of the programme so that the public and NHS Trusts have access to key developments using flyers, websites and Trust intranet and bulletins.

• Patient Involvement: A patient representative enables the service user perspective to be captured and considered when reviewing changes, standards and quality of service.

Evidence of outcomes to show we are making a difference is required, but proof of effectiveness through ongoing monitoring of process and outcomes is hard to substantiate. There are compliance details which may reflect clinical engagement, but Trusts want to see proof of patient outcomes not just the process.

Conclusion

The WCCIP had ambitious aims. Achieving significant change in clinical practice is never easy; to do so simultaneously across all Trusts in Wales, in a pre-determined timescale, with no ability to enforce change other than professional and managerial influence, and when the service is beset by numerous initiatives, is indeed ambitious. But it succeeded. The analysis set out in this report identifies the key reasons for the Programme’s success, and those (relatively minor) issues which should be addressed before any roll-out or other similar initiatives are attempted. Most importantly, this experience demonstrates that this sort of collaborative model, when appropriately led and resourced, is one which should prove adaptable to other similar clinical change tasks.

Appendix III

This has been a clinician led initiative which has been invaluable in terms of motivation, understanding the issues and credibility.

The way in which Programme Managers tackled the business of targets through peer pressure and consensus is to be acknowledged.

The monitoring and corrective action decided locally by the people concerned seems to have created a culture where people own the problem and solve it without outside intervention.

The WCCIP has put into place a process that viewed differently is action learning and they have done this successfully.

Weaknesses

• The Learning events, used as a forum for discussion, sharing and networking, were mis-fitted and therefore off putting, resulting in poor representation from Trusts despite Programme Managers efforts to encourage attendance.

• Programme Managers need to be assured of dedicated and protected time for their role as they have relied on using their own time to achieve goals.

• Resources such as early implementation of PR and marketing processes in future improvement programmes are necessary to avoid missed opportunities to highlight what has been done.

• Databases and web site need improvement in terms of unity of databases used, accessibility and reliability and to be user friendly.

• More patient representation in Trusts Local Improvement Groups is required to reflect the valuable perspective they can bring to service delivery and improvement issues.

Evidence of outcomes to show we are making a difference is required, but proof of effectiveness through ongoing monitoring of process and outcomes is hard to substantiate. There are compliance details which may reflect clinical engagement, but Trusts want to see proof of patient outcomes not just the process.

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1. This needs to be viewed in the context of Trust wide PPI strategy as this is a common problem for all Trusts.

2. Time to build the infrastructure to identify and support patients involved in this and to sustain this.

3. In terms of WCCIP this process was the starting point and requires time to develop.

Evaluation of the improvement project should run simultaneously with the project commencement to capture the relevant data throughout the project.

University of Glamorgan, Cheryl Phillips, Senior Lecturer, March 2007
Appendix IV

Risks Analysis
Early on in the programme NLIAH conducted a risk analysis to ensure countermeasures were in place early enough to reduce the impact of the identified risks. Presented below is an analysis of how this process has been managed to date:

<table>
<thead>
<tr>
<th>Risk</th>
<th>Countermeasure</th>
<th>Results</th>
</tr>
</thead>
<tbody>
<tr>
<td>Level of data collection required and lack of local dedicated data resources within units</td>
<td>NLIAH provided sites with funding allocations to set up data collection processes and potentially back-fill staff</td>
<td>Where this resource has been used efficiently, data collection has assisted the programme locally</td>
</tr>
<tr>
<td>Lack of nationally agreed definitions for elements of data analysis - e.g. some outcome measures</td>
<td>Programme worked closely with national team developing minimum data set</td>
<td>Programme’s objectives are to increase compliance with bundles. Data not being used to benchmark. Local teams continue to monitor their own progress in outcome measures</td>
</tr>
<tr>
<td>Potential duplication / conflict with aims of the Critical Care Networks to be established at the end of the programme</td>
<td>Continued close working with WAG and the advisory group established to inform the development of the Critical Care Networks</td>
<td>Findings from this programme have fed into the establishment of the Critical Care Networks</td>
</tr>
<tr>
<td>Disengagement of the Welsh Intensive Care Society (WICS) if programme seen as target-driven, top down approach</td>
<td>Clinical Lead appointed due to previous appointment as Chair of WICS, and detailed experience of the bundle approach. Collaborative approach used to ensure national support for way ahead</td>
<td>Collaborative approach has been evaluated and will be used to inform the design of future NLIAH programmes, as it has shown to increase engagement and local support</td>
</tr>
</tbody>
</table>