

Target CLAB Zero National Collaborative to Prevent Central Line Associated Bacteraemia

Annual Report September 2011 to August 2012

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Confidentiality

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Foreword

Infection Prevention and Control (IPC) is an important focus for New Zealand's health care sector. Healthcare associated infections, such as Central Line Associated Bacteraemia (CLAB), contribute to poor patient safety outcomes and additional costs to the health sector. Measuring rates of healthcare associated infections and the implementation of efforts to reduce those infections provides useful information on healthcare quality and safety for policy makers, health service managers and clinicians.

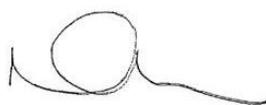
This report presents findings based on data collected from District Health Boards from January to July 2012 on both the number of CLAB events as well as compliance with CLAB insertion and maintenance bundles.

This collaborative has engaged every Intensive Care Unit (ICU) in New Zealand, changing practice in every critically ill patient that has a central line. In terms of our outcomes, this has resulted in a decrease in the CLAB rate from an approximate, retrospective rate of 3.32 to 0.37 per 1000 line days.

We are seeing healthcare professionals re-frame their approach to preventing patient harm from Healthcare Associated Infections (HAIs). Results in this report reflect the large efforts made in the health care sector to prevent CLAB through compliance with central venous line (cvi) insertion and maintenance bundles, improved local-level data collection as well as more general efforts to increase compliance with good hand hygiene practice in all parts of a patient's hospital journey. Data collection reliability has improved with the increased understanding of the operational data definitions, education on standardisation of performance and making the 'right thing the easiest thing to do'.

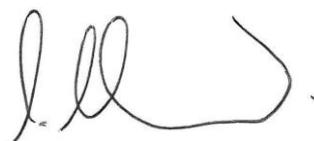
The collaborative methodology has been successful in the New Zealand context and will be important for the future implementation of this or similar programmes. Together with clinical leads, the HQSC and Ko Awatea will work to continuously improve the quality of infection prevention and control, data collection and reporting.

Dr Margaret Aimer



Head of Health Systems Improvement

Dr Shawn Sturland



National Clinical lead, CLAB Zero

Document Purpose

The purpose of this document is to provide a summary of progress made in the first year of the national collaborative to prevent Central Line Associated Bacteraemia (CLAB). The data reported is from January 2012 to July 2012.

The document will:

- Highlight achievements and include process and outcome measures
- Outline the project structure and methodology used
- Document early project risks and capture relevant learning
- Provide recommendations on how this programme could be extended beyond April 2013.

1. Background

Central venous lines (CVL) are catheters that are inserted to lie within one of the great vessels, are used to administer medications or fluids and are frequently used for patients admitted to Intensive Care Units. There are approximately 19,000 ICU admissions each year in New Zealand, with variation between intensive care units in the proportion of those who have a central venous line inserted.

Patients with a central venous line are at risk of infection, referred to in this report as Central Line Associated Bacteraemia (CLAB). There is good evidence to suggest that patients with CLAB experience a greater number of complications and an increased length of stay compared to what would be expected from patients without central line associated bacteraemia. There is also evidence that shows CLAB is associated with excess health care costs, estimated in New Zealand to be at least \$20,000 per case of CLAB. While CLAB is serious resulting in poor patient outcomes and increased healthcare costs it is preventable.

At the commencement of this initiative there was incomplete information to accurately quantify the extent of the problem nationally. The number of CLAB episodes in the four major units in Auckland was estimated to be between three and seven per month. Early data (2008) from Counties Manukau Health revealed a rate of 6.6 per 1000 line days (Seddon ME et al, NZMJ. 2011 July 29; 124). The national pre-implementation rate was retrospectively estimated to be 3.32 per 1,000 central line days by participants completing a retrospective analysis of their data over a 12 month period.

National CLAB Prevention Collaborative

This collaborative, funded by the Health Quality and Safety Commission, commenced in October 2011 and is to continue until April 2013. It is providing leadership, coordination and data management across all DHBs to implement these measures.

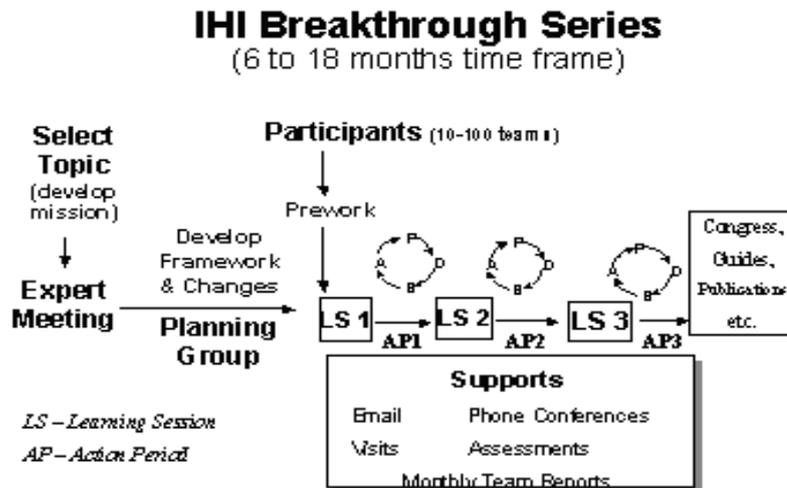
Key Objectives of this project are to:

- Reduce the rate of CLAB in New Zealand ICUs towards zero (<2 per 1000 line days by 30 April 2013)
- Share evidence based practices and provide leadership, coordination and data management that will lead to sustainable improvement and better patient safety outcomes
- Establish a robust national measurement approach for CLAB
- For each DHB to roll out the CLAB prevention tools to at least one other hospital area
- Develop sustainable clinical networks.

2. The Collaborative Methodology

The methodology being used to deliver this programme is the Institute for Healthcare Improvement's (IHI) Breakthrough Series Collaborative which is a short-term (6 to 18 month) learning system that has brought together the Intensive Care Units from all 20 District Health Boards. New Zealand has 25 ICUs in 20 DHBs. Three units have few, if any central line days and are participating in the collaborative but not providing data. This collaborative has included: pre-work; team coaching; face-to-face and "virtual" meetings in which teams are learning from experts and each other; monthly reporting and assessments and ongoing support from experts, peers and the Project Team during Action Periods, when DHBs apply the learning and implement iterative tests of change. Coaching and improvement measurement are facilitated by a shared web-based data base, which includes the capability to display and analyze annotated data over time at both team and aggregate levels. Teams in this Collaborative, report monthly on progress toward their goals.

IHI BREAKTHROUGH SERIES COLLABORATIVE MODEL



Based on experience in more than 65 Collaboratives, IHI has identified the elements that are most strongly associated with successful teams and these elements include:

Creating Will

- The support of leadership for the improvement project and the resources to do the improvement work;
- A clear understanding of how the improvement aligns with the organisation's strategic priorities; and
- A team with capable leadership and champions.

Ideas

- Selection of high-leverage, evidence-based ideas.

Execution

- Of ideas. Active and frequent testing of ideas; and
- Using real-time measurement at the outset to guide the testing

This section outlines factors that have contributed to the DHBs reducing their CLAB rates and includes:

- Clinical engagement and leadership
- The structured approach to improvement
- Communication

Clinical Engagement and Leadership

At the outset of the project each participating ICU was requested to name a project lead and clinical lead, each having defined roles and responsibilities in delivering the changes required in their units. This programme could not have achieved so much without involvement of the project and clinical leads, and the participating IPC nurses. They are to be congratulated for the focus and collaboration that has helped achieve the outcomes to date.

- All 20 DHBs are engaged in this programme
- 22 ICUs/High Dependency Units (HDUs) are reporting on their CLAB rates
- 22 units are reporting compliance to the insertion 'bundle'
- 15 units have reported zero CLAB since the commencement of reporting in January 2012
- 10 DHBs have commenced roll out to another ward area.

The clinical lead concluded that “Target CLAB Zero has enabled DHBs to work together and put in place an agreed, standardised measurement system. For the first time, we are all speaking a common language about this important health issue”.

Structured Approach to Improvement

The collaborative methodology has proven to work extremely well as a structured way to implement evidence based practices that have been enhanced by using local knowledge and skills within the New Zealand context.

The collaborative methodology encourages both a bottom up and top down approach with the staff providing the care being given the tools, knowledge and direction to solve their own problems within a wider 'community' of like-minded individuals and teams. The methodology includes learning sessions and action periods which support engagement and enhance implementation.

All DHBs have demonstrated their engagement through good attendance at the initial preparation learning session, both Learning Sessions One and Two, regional meetings, WebEX telephone conferences, and site visits. The enthusiasm and commitment of the DHB unit teams has been extraordinary and has demonstrated the cornerstone qualities of any successful collaborative through their building of “Will, Ideas and Execution”. The teams can be proud of what they have achieved in the last 12 months. The collaborative

methodology has transformed the regional teams, focusing their efforts to collaborate as part of this national initiative.

The Learning Sessions (LS) have been a good vehicle for the sharing of information and developing new knowledge around the implementation of the insertion and the maintenance bundles. The overwhelming feedback from the learning sessions has been that participants have felt energized, motivated and benefited from the presentations, the interaction with colleagues and the planning for the next action periods. The final LS scheduled for March 2013 will focus on celebrating results and embedding sustainability planning.

Table 6 Summary of Learning Sessions (LSs)

Event		Main Focus	Attendees
Initial preparation LS	Oct 2011	Building will and enthusiasm, provision of information, introduction to the collaborative methodology and IHI training	16
LS 1	Nov 2011	Methodology, tools and understanding data. Get ideas for Improvement. Refine aim and measures and provide participants with the "How to Guide" and DVD.	50
LS 2	June 2012	More ideas for change. Deeper understanding of testing and implementation. More collaboration. Prepare for next Action Period	52

Regional Meetings

These are held every two months and are aimed at maintaining momentum, sharing of ideas and problem solving.

Table 7 Attendance at Regional Meetings by Region

	Jan	Feb/Mar	May	July	Total
Northern	12	11	10	12	45
Midland	11	14	9	0*	34
Central	9	11	20	15	55
Southern	14	15	15	9	53

**The Midland meeting was postponed in July due to a number of unplanned events*

Attendance at IHI Training

This collaborative has provided sponsored attendance for participants at the IHI training in October 2011 and March 2012, both in Improvement Science in Action (ISIA) at which 20 participants from 12 DHBs attended and Breakthrough Series Training at which 9 participants attended from 6 DHBs. This training has been critical in building capacity and capability across DHBs not only for this collaborative, but as a way to continue quality improvement work in the future.

Communication

A communication plan was established at the outset of the programme and used by the project leads to communicate within their organization and units. Having consistent and regular communications to all stakeholder groups to give regular updates, celebrate milestones, and reinforce the aim and the implementation strategies is critical. This helps engagement, helps to socialize the bundles of care, celebrates achievements and builds sustainability.

3. Project Structure

A national steering group has provided overall governance and leadership to the collaborative. This group has had overall accountability for the collaborative and has reviewed progress and results. The national steering group includes the following people:

- National Clinical Leader (ICU specialist)
- National Project Manager
- Improvement Advisor
- Clinical IPC specialist
- HQSC Clinical Lead for Infection Prevention and Control

An expert measurement group has also been established. Operational data definitions are agreed through this group before being endorsed by the national steering group.

4. Methods

The collaborative has been run at a national, regional and local level, driven by the national steering group through regional project teams. The coaching and support from the national Project Manager, Improvement Advisor and National Clinical Leader has aimed to support the individual ICU level as well as the regional teams.

The focus of the measurement has been on measurement for improvement and as such the purpose of our data collection has been to accept consistent bias, collect “enough” sequential data with a flexible hypothesis that changes as learning takes place. This is different to measurement for accountability or research (see table below). The data collected is used primarily by those involved in the improvement and presented as run charts or Shewart control charts (Lief Solberg et al, Journal on Quality Improvement vol.23. No 3, (March 1997), 135-147, as in Table 1.

Table 1 The Three Faces of Measurement

Aspect	Improvement	Accountability	Research
<u>Aim</u>	Improvement of care (efficiency & effectiveness)	Comparison, choice, reassurance, motivation for change	New knowledge (efficacy)
<u>Methods:</u>			
• Test Observability	Test observable	No test, evaluate current performance	Test blinded or controlled
• Bias	Accept consistent bias	Measure and adjust to reduce bias	Design to eliminate bias
• Sample Size	“Just enough” data, small sequential samples	Obtain 100% of available, relevant data	“Just in case” data
• Flexibility of Hypothesis	Flexible hypotheses, changes as learning takes place	No hypothesis	Fixed hypothesis (null hypothesis)
• Testing Strategy	Sequential tests	No tests	One large test
• Determining if a change is an improvement	Run charts or Shewart control charts (statistical process control)	No change focus (maybe compute a percent change or rank order the results)	Hypothesis, statistical tests (t-test, F-test, chi square), p-values
• Confidentiality of the data	Data used only by those involved with improvement	Data available for public consumption and review	Research subjects’ identities protected

Reference Lief Solberg et al, Journal on Quality Improvement vol.23. No 3, (March 1997),

Measuring CLAB in New Zealand

At the start of this initiative very few ICUs were counting line days and measuring their rate of CLAB per 1000 line days. A baseline was established by units completing a retrospective audit against the National Healthcare Safety Network (NHSN) definitions.

The CLAB rate is calculated by dividing the number of CLAB by the number of central line days and multiplying the result by 1,000. The estimated baseline CLAB rate was 3.32 per 1,000 line days. Reliably identifying cases is complex and reliant on the level of training and understanding of the clinician applying the definition, the reliable collection of two sets of blood cultures, the complexity of the case and the working relationships of the multi-disciplinary team members required to determine whether or not the case is a

CLAB. Retrospective analysis to establish this baseline is likely to have missed cases and 3.32 per 1000 line days is likely to be an underestimate.

For the majority of units the establishment of reporting and recording structures has been new to them and over time their ability to consistently apply the clinical and data definitions has been encouraging.

Incidence Rate

The incidence rate is the rate of CLAB for every 1,000 line days and was calculated by dividing the number of CLAB by the number of central line days per month and multiplying the result by 1000.

Insertion bundle percentage compliance rate

This is a measure of how well the team is adhering to the bundle of care (formatted into the insertion checklist). Although the checklist itemises the individual components of the bundle, the measure is whether the entire bundle has been implemented each time – an ‘all or nothing’ indicator. If even one element is missing, then the case is **not** in compliance with the bundle. For example: If there are seven patients with central lines, and six have all elements of insertion checklist completed, then compliance = $6/7 \times 100 = 86\%$

Compliance with insertion checklist = $\frac{\text{no. with all elements of bundle completed}}{\text{Total number of insertions}} \times 100$

Maintenance bundle percentage compliance rate

This is a similar measure to the insertion checklist compliance, but in this case it is compliance with the maintenance checklist for each shift. Any shift that is not compliant with all the elements of the maintenance bundle means that overall maintenance compliance for that day is not achieved.

Definition of ‘Central Line Associated Bacteraemia’ and ‘line days’

The definition of CLAB used by the national CLAB collaborative includes patients who had a central line at the time of infection or within the 48-hour period before development of infection. Cases are excluded if the infection is related to any other infection the patient might have and must not have been present or incubating when the patient was admitted to the facility.

The CLAB definition is based on the US Centers for Disease Control and Prevention (CDC) National Healthcare Safety Network (NHSN) definition of 2008, endorsed by the HAI Advisory Committee of the Australian Commission on Safety and Quality in Health Care (ACSQHC) and all Australian jurisdictions in 2011. This definition was endorsed locally by the Steering Group and the Measurement Group.

This definition is a surveillance definition for CLAB and does not necessarily correlate with the clinical definitions of infected central lines. It is important that the attribution of a CLAB is done by someone external (e.g. Microbiologist, Infectious Diseases physician, Infection Prevention and Control nurse) to the unit in which the 'potential' CLAB occurred. The detailed notes for this definition can be sourced in the 'Measurement and Reporting Guide for the National Collaborative' available on the website www.koawatea.co.nz.

Measuring CLAB focuses on those patients within intensive care units. As the initiative has progressed some units are now including central lines inserted in other areas, for example theatres, wards, radiology.

Definition of central venous line days

Central venous line days refer to a daily count of the number of patients in the Intensive Care Unit with one or more central lines of any type. Two methods are used to calculate the number of line days: If the unit is unable to track all central lines then they use the tally method. This involves counting patients with central lines 3-5 days per week and using this sampling to estimate the total central line days for the month. In units with databases the actual line days are recorded per month.

Consistency of the application of CLAB definitions has improved with the development of a measurement guide and the operational definitions documents. Data reliability has been a focus throughout this collaborative and ongoing work includes:

- Education of clinicians applying the definitions
- Refinement of the operational data definitions
- Mapping of data collection processes by each unit
- Establishment of clinical expertise to help interpret difficult results
- Strengthening of relationships across the multi disciplinary teams

- Developing data bases that have built in constraints that support input of accurate data
- Numerous data validity checks

The measurement of CLAB, particularly at the regional level is dependent on the organisation of intensive care units in New Zealand and their case-mix. There are three levels of Intensive Care Units and High Dependency units. The level one units are those with the lowest acuity and lowest volume of patients.

Table 2 Summaries the units in New Zealand

Northern Region	Midland Region	Central Region	South Island
Whangarei (Northland DHB)	Waikato (Waikato DHB)	Hawkes Bay (Hawkes Bay DHB)	Wairau (Nelson Marlborough DHB)
North Shore (Waitemata DHB)	Taranaki Base (Taranaki DHB)	<i>Wairarapa (Wairarapa DHB)</i>	Nelson (Nelson Marlborough DHB)
Auckland DCCM (Auckland DHB)	Tauranga (Bay of Plenty DHB)	<i>Palmerstone North (MidCentral DHB)</i>	<i>Grey Base (West Coast DHB)</i>
Auckland CVICU (Auckland DHB)	<i>Whakatane (Bay of Plenty DHB)</i>	<i>Wanganui (Wanganui DHB)</i>	Timaru (South Canterbury DHB)
Middlemore (Counties Manukau DHB)	Rotorua (Lakes DHB)	Hutt (Hutt Valley DHB)	Christchurch (Canterbury DHB)
Auckland Starship PICU (Auckland DHB)	<i>Gisborne (Tairāwhiti DHB)</i>	Wellington (Capital & Coast DHB)	Dunedin (Southern DHB)
			Invercargill (Southern DHB)

In bold italics are level 1 units and the remainder are level 2 and 3

5. Results

This section describes the results achieved in the three key measures:

- Rate of CLAB per 1000 line days
- Percentage compliance to Insertion Bundle
- Percentage compliance to Maintenance Bundle

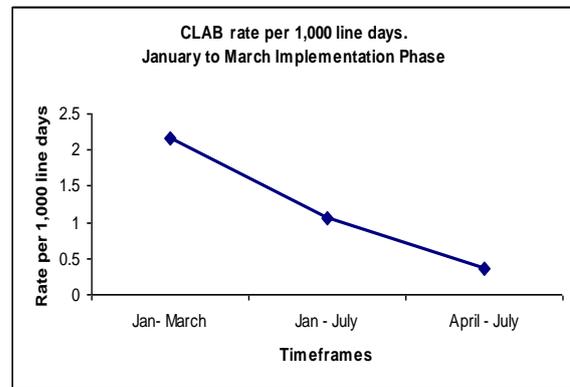
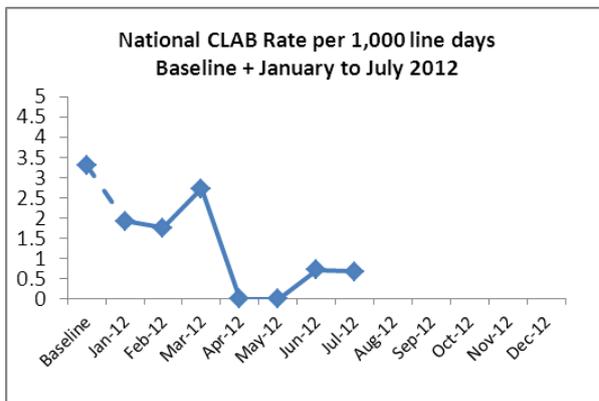
Results: National Incidence rates of CLAB

There is evidence that the objectives of the national CLAB collaborative have been more than met. For the period April to July the national CLAB rate was 0.37 per 1000 line days well below the targeted rate of <2 per 1000 line days.

The national CLAB rate for the period January to July 2012 was 1.06 per 1000 line days. The CLAB rate in the implementation phase, from January to March 2012, was 2.17 per 1000 line days. In the post-implementation quarter, April to July 2012, the national CLAB rate was 0.37 per 1000 line days. The graphic below demonstrates the impact of the implementation of the insertion and maintenance bundles.

Table 3 National CLAB Rate per 1,000 central line days January to July 2012

ALL DHBs	Jan	Feb	Mar	Apr	May	Jun	Jul
No. of CLAB	4	4	7	0	0	2	2
No. of Line Days	2042	2319	2533	2380	2668	2913	2992
Rate per 1,000 line days	1.95	1.72	2.76	0.0	0.0	0.69	0.66



National CLAB rate per 1000 line days

Impact post implementation phase

Regional CLAB Rate

There has been an increase in the number of central line days overall across each of the regions, as the accuracy of line day data capture has improved. It should be noted that the Northern Region makes up 44% of the total line days (7941/17847) x100.

Table 4 CLAB Rate/1000 Line Days by Region

	Jan	Feb	Mar	April	May	June	July	Total
Northern	883	1042	1191	1054	1214	1261	1296	7941
Midland	383	423	483	524	519	636	640	3608
Central	454	535	529	468	537	601	700	3824
Southern	322	319	330	334	398	415	356	2474
Grand Total	2042	2319	2533	2380	2668	2913	2992	17,847
Number of CLAB	4	4	7	0	0	2	2	19
Rate/1000 line days	1.95	1.72	2.76	0.0	0.0	0.69	0.66	1.06

Reduction in morbidity and excess costs associated with CLAB

The reduction in the national CLAB rate from an estimated 3.32 per 1000 line days to 0.37 per 1000 line days is of considerable benefit to patients and to the New Zealand healthcare system. It represents reduced morbidity rate, shorter lengths of stay in hospital, and a reduction in the economic burden of CLAB. These early results provide strong incentive for the continued application of cost-effective, evidence based preventive measures.

Reduction in costs

The cost per CLAB has been estimated to be approximately NZ\$20,000 in New Zealand (Burns et al, 2010). There is an initial cost saving associated with the reduction in CLAB rate, however, once the rate is sustained at zero the greatest benefit from this programme will be the improved outcome for patients. Using this figure the decrease in the number of CLAB per month being 4-6 cases cost savings are between NZ\$480,000 and NZ\$720,000 (4X6 X20, 000) (6 X 6 X 20,000).

Patient Benefits highlighted

A patient arrived at Middlemore from Auckland DHB with a CVL in place. Prior to this programme this CVL would have been removed and a new line inserted. This patient kept the existing line and avoided the trauma of having it replaced. 'This is really exciting because its shows the positive difference the staff make, most importantly for the patient' (Catherine Hocking ICU Middlemore Hospital)

Process Outcomes

There is evidence that the objectives of the national collaborative to prevent CLAB are being met, measured as adherence rates to the insertion and maintenance bundles. Between January and July 2012 the national percentage compliance rate for the insertion bundle was 83% and for the maintenance bundle was 70%.

Percentage Compliance with Insertion Bundle

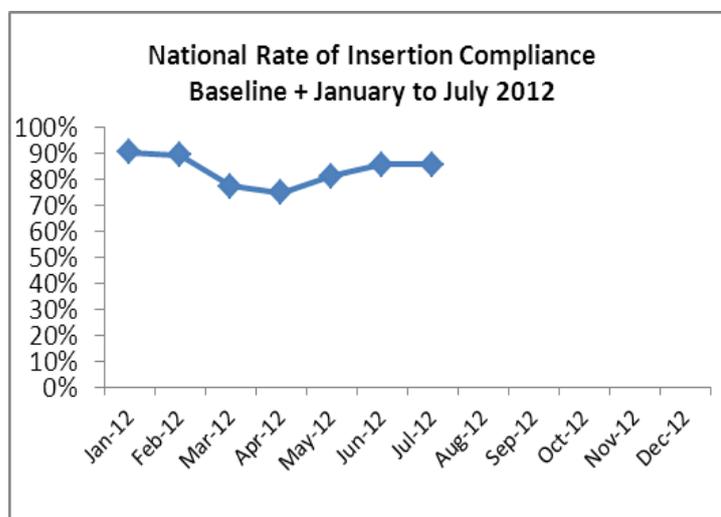
Nationally 22 units are reporting compliance to the insertion bundle. The main barrier to increasing compliance rates is reported to be the size of the drape and shape of the aperture of the drape. As the collaborative has progressed, the volume of insertion data

has increased due to the inclusion of data by some DHBs from the areas that they have spread to, such as theatres.

Table 3 Percentage Compliance with Insertion Bundle

ALL DHBs	Jan	Feb	Mar	Apr	May	Jun	Jul
No of CVL insertions compliant with bundle	159	151	153	350	297	373	463
No of CVLs inserted	175	170	203	453	375	422	540
COMPLIANCE RATE	91%	89%	75%	77%	79%	88%	86%

The graphic below shows the national insertion compliance from January 2012 to July 2012



Percentage Compliance with Maintenance Bundle

The measurement of compliance to the maintenance bundle has proven to be a challenge to some DHBs. The variation in the numbers can be accounted for by the fact that DHBs have staged the introduction of the maintenance bundle over this six month period with some early adopters and others that had not implemented the maintenance bundle by June 2012.

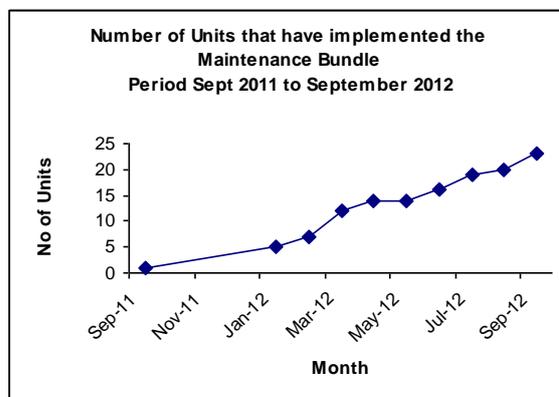
Canterbury DHB reported difficulties with their data base and incorrect reporting of numbers for the month of July. The definitions have remained consistent in terms of what a line day is and how to count compliance but some DHBs have struggled with the refinement of their data processes particularly in the recording of the bundle components across all shifts for the day. Unlike insertion compliance documentation, the

documentation for the maintenance bundle is done on each shift and if one shift fails to complete the documentation is considered non compliant.

The drop in the rate of compliance in the June and July periods can be attributed to the DHBs identifying a gap between documentation of the work being done and what was actually recorded as being done. Project and Clinical Leads believed that the percentage compliance recorded did not reflect practice as they were told by staff that the components of the bundle had been met but not recorded. For the purposes of data collection and maintaining a consistent approach, not recorded equalled not done and therefore non compliant. Three DHBs also implemented data bases in the June to July period and had a number of issues including the data base counting line days post discharge of the patient from the ICU.

Note: As part of this project Christchurch rolled out a database to capture the insertion and maintenance compliance data and reported that the denominator figures for the maintenance bundle were incorrect for June and July 2012. The data base had a “bug” and was significantly over counting the number of line days. This has subsequently been fixed and the values corrected retrospectively.

Maintenance Bundle uptake across the DHBs & Maintenance Compliance



Other Notable Outcomes

- Development and agreement on process flow for obtaining blood cultures
- Development towards a standardised approach to determining a CLAB from a positive blood stream infection (BSI)
- Establishment and development of four regional reusable CLAB networks
- Increase in staff awareness and commitment to reducing CLAB
- Development of a national approach to the prevention of CLAB including the development of the following resources:

1. 'How to guide' promotional material
2. DVD on the Middlemore Hospital experience
3. DVD on the maintenance bundle
4. National Collaborative Project Charter
5. Checklist to assist with determining the next most appropriate clinical area for roll out
6. Development of a multi-disciplinary approach incorporating the expertise of the Infectious Diseases (ID) Physicians, Clinical Microbiologists and Infection Prevention and Control (IPC) Nurses
7. Development and procurement of a national insertion pack leading to on-going reduction in costs and consumables (from \$89 to \$59 per pack since introduction)
8. Increased capacity and capability in implementing the IHI Model for Improvement.

6. Limitations Discussion

At the start of this collaborative very few ICUs were counting line days and measuring their rate of CLAB. Three units had implemented the insertion bundle and only one unit had formally implemented the maintenance bundle. The variation across the country in the insertion and maintenance of CVLs was significant and there was no common language, common definitions nor standardisation of processes.

There was significant confusion between the surveillance definition and the clinical definition as well as who was involved in the determination of a CLAB. A number of the DHBs had not developed a multi-disciplinary team approach. There was also inconsistency in the process for taking blood cultures (both the number of sets and the sites that blood was taken from), which is important as if only one set is taken this limits the ability to determine if a common skin contaminant has caused a CLAB.

As we have improved on these limitations the validity and reliability of the data has also improved and evolved as more DHBs implement both the insertion and maintenance bundles, and standardize their blood culture collection processes.

In the absence of any more reliable definition available for CLAB the CDC definition of CLAB has been incorporated in the Measurement Guideline and provides a common

language for all clinicians. As quoted by Dr Chris Mansell, Microbiologist, “If there was a more biologically accurate definition (which is what we need for credibility and quality improvement) and one which was easily feasible to use, then the international CLAB community would be discussing it now. For the time being, we need to recognise the limitations of what we are using and keep an open mind regarding future refinements”.

Since this outcome measure definition has been applied in many settings, difficulties and inconsistencies can occur. Checks have been put in place to determine the reliability (measuring something consistently, the repeatability of the process), and validity (whether or not we are measuring what we intended to measure) of the measure.

Some of the checks that have been put in place include:

- Development of the Measurement Guidelines with input from clinicians
- Development of the operational data definitions which describe the boundaries around which data may be collected and how and what is collected and reported
- Development of a surveillance checklist that has been completed by the multi-disciplinary teams operating in the DHBs
- Presentation and interpretation of case studies by a Microbiologist.

The purpose of the data for this collaborative has been for improvement and as such has focused on improving the care processes through the implementation of the insertion and maintenance bundles and outcomes for patients to reduce the rate of CLAB. There is acceptance of a consistent bias, data are collected over time, variation noted and small cycles of improvement tested.

The data have been meaningful and understandable to many users with multiple cycles of improvement put in place to improve both clinical and data processes.

There is evidence and agreement that significant positive improvements have occurred with particular reference to the increased robustness of recording and reporting CLAB. There has been evidence of improvement in the percentage compliance rates to the insertion bundle and ongoing uptake of the maintenance bundle components as more DHB units roll out the maintenance bundle.

Affordances such as the development of the national pack have also made the right thing the easiest thing to do for those 10 DHBs that have implemented the use of the insertion pack. This will soon be made available to all units across the country

With the improvements made in the processes for ascertaining whether or not it is a CLAB one would have expected the number of CLAB reported to increase over time but this has not been the case. With increased surveillance and introduction of multi disciplinary teams working together the number of CLAB reported per month has reduced from six to a maximum of two per month nationally.

There is an opportunity for further refinement of these processes and to develop a tool for quality assurance purposes.

7. Risks

This section outlines identified risks and includes:

- Initial scoping and phasing of the project
- Rolling out to other areas

Initial Scoping and Phasing of the Project

The scope and phasing of the project was developed jointly between HQSC and Ko Awatea. Prior to implementation it was recognised that not all the information required to plan and develop this project was known. This section outlines some of those factors that have become clear as the project has progressed.

1. At the start of the project it was assumed that roll out to ICUs and at least one other ward area across all 20 DHBs was achievable within 18 months. A review of the literature and experience from CMDHB, Scotland and Wales suggests that implementation in ICUs takes up to two years and that the challenges associated with roll out to one other ward area are significant.
2. Insufficient time was allowed to establish 'buy in' to the programme. The first training and coaching sessions offered by the IHI occurred within the first month of the commencement of the Project Manager. This allowed less than four weeks for the Project Charter, Project Plan and overall implementation of the agreed milestones to be delivered, namely 'buy in' from all 20 DHBs and representation of all 20 DHBs at the IHI training session.
3. There was an initial expectation that there would be just one representative from each of the 20 DHBs at the IHI training. To provide adequate training in IHI methodology a representative was needed from each ICU unit. There was also

benefit in more than one person from an ICU being trained in Improvement Science in Action (ISIA) which was not accounted for in the initial funding model.

4. The assumption that DHBs were already collecting their CLAB rates per 1,000 central line days proved to be incorrect. Only two DHBs could report a rate per 1,000 line days. This delayed the collection of national baseline data.
5. CLAB definitions were applied inconsistently and the process for collection of blood cultures was variable across the country.
6. These issues have been identified as the programme progressed. The HQSC and Ko Awatea have worked in partnership to adapt the contract where needed with some variations agreed. The rapid learning achieved was made possible by Middlemore Hospital sharing what they had learned since implementing their CLAB project in 2007, and providing teams with a 'How to Guide', a DVD and ongoing access to their expertise.

Rolling out to Other Areas

Ten DHBs have already commenced the roll out to at least one other area outside ICU. Project leads have expressed their concern in regards to ongoing organisational support to roll out this programme outside of the ICU because of the challenges of maintaining accurate data collection and reporting. Part of the sustainability plan for roll out will be to 'recruit' and engage IPC nurses who are not actively involved in the programme and to put in place training and ongoing support.

8. Recommendations

This section outlines recommendations and includes:

- Focus over the next six months
- Factors to consider beyond April 2013

Focus over the Next Six Months:

The Project Leads and Clinical Leads will be assisted to maintain and enhance their organisational support. Focused communication will be sent via the Chief Executive Offices to each DHB.

Patients and their families can be powerful allies in reminding staff to follow hand hygiene standards and to comply with safe practices. The project team will support the DHB teams to identify ways to include patients and their families in this endeavor to reduce CLAB rates.

There is an opportunity to identify and coach staff outside of the ICUs to take part in this collaborative. Identifying other champions and including staff not already involved, particularly those who have roles that either support improvement or have a focus on general infection and control will assist in spreading and sustaining this initiative. This may include IPC nurses, Intravenous Nurse Specialists, Clinical Microbiologists and ID Physicians.

The Project Leads have expressed concern at the amount of work required to roll out to other areas within their DHB. The National Team will be supporting the local DHB teams to identify their champions and to develop their education packages.

Current systems and processes for the monitoring, recording and reporting of data will continue to be refined.

Sustaining the Achievements of the Collaborative beyond April 2013

This section describes the areas that need to be considered to support the DHBs in their ongoing endeavors to roll out to other areas within their DHBs as well as sustain ongoing monitoring, recording and reporting. Continuing to improve practice will be reliant on a number of factors:

- Clinical leadership has been shown to be vital both within the DHBs and at a regional level.
- Those teams with strong support from their executive management teams are more likely to have ongoing high level backing to sustain improvements in practice. Senior management teams have considerable influence on the allocation of resources and prioritisation of focus.
- An important factor will be the ongoing involvement and further recruitment of the ID Physicians, the Clinical Microbiologists, and IPC services, as well as ongoing leadership from across the clinical spectrum.
- After the completion of this project in April 2013 a governance structure will be required to provide ongoing support and leadership, as well as the funding to provide oversight of this important work.

Ongoing Data Recording and Reporting

The ability of DHBs to continue to collect and report data is one of the key factors in the sustainability of the CLAB Zero project. Those DHBs with an electronic data base are at a distinct advantage (CMDHB, BOPDHB and CDHB).

It will be critical to have a central data repository with resources to continue the national oversight of the data collection, recording and reporting. Currently the online national data base is the IHI Extranet which will be in place for the duration of this collaborative. Data collection and verification is currently a shared responsibility between the ICU and IPC specialists in each of the DHBs.

The collation, monitoring and reporting of data is currently undertaken by the team at Ko Awatea, namely the Project Manager and Data Analyst. This is supported by advice from the Improvement Advisor Consultant and the Clinical Director of Quality Improvement at Ko Awatea.

The concept of DHB “Infection Prevention and Control Excellence” support teams to lead the current HQSC IPC initiatives is proposed as a way of keeping the momentum and focus on reduction of CLAB within the broader umbrella of prevention of healthcare associated infections. Future models are still to be developed. In the interim it will be critical to maintain central co-ordination, monitoring, reporting and recording activities.

9. Conclusion

The level of will, ideas and execution by the participating teams is impressive. Achievements in the first year have demonstrated the benefits of having a robust process established in the pilot site. The success to date can be attributed to the collaborative methodology that has been proven to work extremely well in spreading evidence based best practice, provided there is good clinical, project and management leadership. National clinical leadership, supported by three Regional Leads and on site unit Clinical Leads has been invaluable. The programme is further supported by the expertise of an Improvement Science Advisor, consulting independently from Washington DC and the Clinical Director for Quality Improvement in Counties Manukau Health.

The challenge and focus for the remainder of the time is to implement systems and processes that sustain the work after April 2013. There is an opportunity to work with the HQSC on an extension plan for this work. Our target, of course, remains CLAB zero, both for the remaining months of this collaborative and beyond April 2013.

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