



CLINICAL EXCELLENCE COMMISSION

**REPORT OF THE REVIEW OF  
ADMINISTRATIVE AND SYSTEM ISSUES  
ARISING OUT OF TWO PATIENT DEATHS  
ATTRIBUTED TO MENINGOCOCCAL DISEASE**

June 2005



CLINICAL EXCELLENCE COMMISSION

June 2005

Ms Robyn Kruk  
Director-General  
NSW Health  
73 Miller Street  
North Sydney  
NSW 2060

Dear Ms Kruk

I have pleasure in submitting to NSW Health the final report of the review of administrative and system issues arising out of two patient deaths attributed to meningococcal disease.

The Review Team thanks NSW Health and the staff of the Shoalhaven District Memorial and Wyong Hospitals for the open and supportive way in which they have facilitated our work.

The team recommends that the staff at both hospitals, and the next of kin of the patients involved, be given feedback on this report as soon as possible.

The Review Team remains ready to assist if we can with the implementation of the recommendations.

Yours sincerely

A handwritten signature in black ink, appearing to read 'Cliff Hughes'.

Clifford F Hughes AO  
CLINICAL PROFESSOR  
CHIEF EXECUTIVE OFFICER

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The Review Team appreciates the enormous distress that the two incidents behind this review have caused the relatives of the patients. The fact that both patients appear to have died as a result of overwhelming and rapidly progressing infection with a recognised virulent organism is perhaps of little comfort. We extend our sympathy to the families concerned.

The Review Team also recognises the significant emotional impact that these tragic deaths have had on the staff who were attempting to treat the patients to the best of their abilities. We extend our concern and support to the staff and encourage them to share their distress with their colleagues and, where appropriate, with counsellors.

The comments in this report do not imply criticisms of the actions of any individuals, but are just a few small steps in the continued improvement of the demonstrably high-quality services at both institutions and, indeed, across the NSW health care system.

## SUMMARY

The biggest challenges facing health systems are the delivery of safe, accessible services to meet the rising demands for hospital treatment and mental health care.

At a time when the standard of health care available to the public is better than it has ever been, we are developing a new way of looking at health care and understanding it. Now, health professionals and their agencies have a greater appreciation of where things can go wrong and acknowledge the role the entire system can play in this.

An appropriate analysis of quality and safety in health care demands that we look directly at the nature of human and system error. There is already a change in culture, from that of individuals working alone on their craft, to teams of professionals working together.

Analysis of the factors that contribute to safe and effective care means that some fundamental changes are needed to ensure this quality of care. There needs to be public debate about the risks associated with providing care locally if the local capacity to provide this care is marginal. There also needs to be public discussion about the nature of health care, its limits and the consequences. There need to be clear roles with responsibility and accountability for care defined at each level of the system. The public needs to be assured that there is an appropriate match between services and resources and that the right processes for organisational and operational discipline are in place and properly funded

This report is one part of such a process.

The Clinical Excellence Commission was not asked to further review matters in relation to two particular patients that have already been dealt with by other review processes. Rather, its brief was to review *systems* in place for the assessment, diagnosis and treatment of meningococcal disease in two health services generally, and in two specific hospitals, to identify areas of improvement and to recommend actions to achieve those improvements.

The Review Team has taken into account both the nature of meningococcal disease, and the particular circumstances of the hospitals involved.

Meningococcal disease is an uncommon disease that affects between 200 and 250 people in NSW each year. It is a severe infection caused by *Neisseria meningitidis* (also known as meningococcus), of which there are several different groups. Serogroup B predominates in children less than five years of age and is almost twice as common in NSW as serogroup C. Serogroup C is associated with higher mortality than serogroup B.

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<sup>1</sup> Australian Council for Safety and Quality in Health Care 2004, p97

The disease occurs in two main forms or as a combination of these two forms. In meningococcal meningitis, the disease progression is usually gradual and mortality is less than 5%. In meningococcal septicaemia, also known as meningococcaemia, the early symptoms of the disease are often non-specific; onset of the disease and its progression are rapid; it can cause death after even a very short illness; and the mortality rate is between 30% and 40%.

Meningococcal infection can present as a spectrum of clinical pictures from a mild, apparently benign disease to overwhelming sepsis with shock. It can be difficult to diagnose at an early stage. In addition, there is no quick and simple blood test that can provide a definitive and rapid diagnostic answer. Neither is there a single vaccine that is effective against all strains of meningococcal disease; there is no vaccine at all to protect against serogroup B meningococcal disease (the most common type in NSW).

The Review Team visited both hospitals, interviewed extensively, and toured the facilities. It found much to praise.

The Review Team's findings and conclusions indicate two busy departments staffed by a dedicated and hard-working workforce. There are some similarities between the two hospitals. Both are in a growth phase and service fast-growing populations in areas characterised by some significant elements of socio-economic disadvantage. Both provide *de facto* general practice services in the light of the lack of opportunities to access bulk-billing general practitioners. Both are situated in holiday areas and thus need to be able to cope with surges in population at the peak holiday times. The makeup of the emergency department medical staff at both hospitals is characterised by a significant proportion of staff on relatively short rotations. Both hospitals have undergone major redevelopment. In spite of such similarities, however, the Review Team found significant differences in the quality of the facilities, the resources available to each emergency department, and the milieu in which the departments operate.

For example, one department is operating out of efficient, new, purpose-built premises and has access to a variety of ancillary services that help it address the needs of its patient base. The other is waiting on the construction of its new workspace and in the interim, is operating in circumstances that could have a serious impact on the quality and the safety of the services it delivers.

The Review Team found major areas for improvement in leadership and communication. It identified systems and processes that should be improved, and additional resources required in each department if it is to be fully effective in providing emergency services to the people who come through their doors.

The Review Team has made 46 recommendations, some of which are specific to one or other of the two hospitals, others of which apply more generally to the two health areas and beyond. In all cases, the recommendations have a direct bearing on the ability of the hospitals and the health services to assess, diagnose and/or treat meningococcal disease. The recommendations and associated findings regarding areas for improvement are summarised at Appendix 2.

In both departments, the rostering of medical officers has been undertaken by a central area health service office, including the use of agency and locum staff as required. It appeared credentialing was not specific to the individual departments, nor was consideration of the skill mix for shifts. This was partially due to the difficulty of filling rosters, especially in peak holiday periods. Medical officers who are new to emergency departments must be given dedicated time for orientation, and have their positions covered during this time. It is also important that there is a safe level of staffing in emergency departments at any one time to attend to the emergency patients coming in the door. This is especially so given the range of other tasks that are allotted to these departments.

Further, many junior staff start new jobs in busy emergency departments in the middle of the holiday season when some senior staff themselves are on vacation. In view of the many rostering issues raised in the review, the Review Team has recommended that a high-level working party be established to investigate general rostering practices.

Given the vulnerability of young children to meningitis, and the high proportion of children seen in both departments, access to paediatric beds and services is a major issue. Accordingly, recommendations regarding paediatric services are made for each hospital according to their particular circumstances.

Good communication is vital for the provision of safe and quality emergency services: communication between the members of the clinical team on the floor, and between the administration and the workers at the coalface. Thus there are recommendations to enhance the quality of communication.

When adverse incidents occur, as inevitably they will, there are well-established systems for review in place in the NSW public health system. Well-timed critical incident debriefing and support for all the clinical staff affected is vital. Similarly, feedback on the results of internal and external reviews must be well timed for both the staff involved in the incident under review and for the patient's next of kin. Therefore one strong recommendation of the Review Team is that the staff at both hospitals, and the next of kin of the patients involved, be given feedback on all the relevant reviews and this report as soon as possible.

The Review Team believes once its recommendations are implemented, the resulting improvements in both Shoalhaven and Wyong Hospitals and in the two area health services to which they belong, will enhance their ability to assess, diagnose and treat meningococcal disease.

## **RECOMMENDATIONS**

### **Recommendations specific to Shoalhaven Hospital**

1. That Shoalhaven Hospital develops a process to clearly identify the senior person in charge of the emergency department in both medical and nursing teams at any particular time. Clear job descriptions indicating roles and responsibilities should be available.
2. That the hospital's executive staff work with the newly appointed director of the emergency department in reviewing leadership roles, responsibilities and resources.
3. That there is a joint meeting of the emergency unit medical and nursing staff at the hand over to the next shift.
4. That Shoalhaven Hospital runs teambuilding exercises that focus on training clinical staff to communicate potential concerns to other members of the team, especially between nursing and medical disciplines.
5. That medical and nursing hospital administrators do a round of wards, including the emergency department, on most days. Given that the hospital is in a growth phase, and given the current reorganisation of the health system into super regional areas, it is particularly important that hospital administrators are more intimately involved at the coalface.
6. That the person who is appointed to the recently funded position of director of medical education is a practising clinician.
7. That NSW Health continues to provide resources for the hospital's administration to be involved in the dissemination, implementation and resourcing of new guidelines, including national and state guidelines and local protocols, through the Clinical Governance Unit and patient safety managers of the area health service.
8. That Shoalhaven Hospital develops and implements a system that will provide all new doctors working in the emergency department with dedicated time for orientation. During this time the emergency medical officer positions should be covered.
9. That the four-bed paediatric unit in the emergency department is opened and resourced to create four additional paediatric beds for priority use for paediatric presentations, including short-stay observations of paediatric patients with concerning clinical signs.
10. That an internal working party that includes emergency department doctors and nurses and local paediatricians is created to finalise protocols, controls and policies for the use of the four-bed paediatric unit in the emergency department.

11. That there is adequate staff to cover both emergency department work and elective admissions, which also pass through the department.
12. That the recruitment, development and employment of clinical nurse practitioners in the emergency department is energetically advanced.
13. That signage in the emergency department is in accordance with NSW Health guidelines.
14. That on arrival at the emergency department, patients are first seen and triaged by a health professional.
15. That feedback on the results of internal and external reviews is done in a timely way for all staff involved in the incident under review.
16. That the staff, and the family of the patient involved, be given personal feedback on the root cause analysis (RCA) and this report as soon as possible, preferably face to face.

### **Recommendations specific to Wyong Hospital**

17. That the physical layout of the current emergency department needs to be addressed urgently.
18. That clinicians remain actively involved in planning for the new Wyong Hospital emergency department.
19. That there is a safe level of staffing in the emergency department at all times to attend to the emergency patients coming in the door.
20. That there are two separate after-hours rosters, one for medical staff in the emergency department and the other for medical staff in the general hospital.
21. That there are appropriate processes and staffing in place to cover clinical staff when they are outside the department, especially for administration duties, such as attending meetings at Gosford Hospital.
22. That there is increased accessibility to trained Mental Health Unit staff to work with the emergency department in the initial assessment and subsequent admission of mental health patients.
23. That the additional paediatric beds in the short-stay ward are opened and the necessary nursing education in paediatric care, and paediatric support and resourcing, are provided.
24. That the ambulatory paediatrics service is developed, adequately resourced and staffed, at the same time that the additional paediatric beds in the short-stay ward are opened.
25. That some dedicated high-dependency areas are opened and suitably staffed for observation of appropriate patients (e.g. coronary patients).

26. That the emergency department is provided with greater ancillary support, noting that units in other hospitals have resources such as an aged care assessment team, nurse educators, social workers, and mental health workers.
27. That all clinical staff wear clear visual identification of their roles.
28. That the staff, and the family of the patient involved, be given feedback on the chart and patient review, and this report, as soon as possible.
29. That the root cause analysis (RCA) route could provide greater transparency and clarity of process in the review of fatal cases of meningococcal disease in young people.

## **General recommendations**

The Review Team noted that some recommendations could have wider applicability to other institutions throughout NSW Health. The following should be disseminated for discussion and action within all Area Health Services.

30. That statewide guidelines be developed to offer children opportunistic vaccination at the site of clinical contact, particularly at institutions where the emergency department fills the role of the primary carer for a significant proportion of the population.
31. That given the high degree of mobility of health care workers, especially medical staff within tertiary and secondment hospitals, emergency department policies and procedures be standardised throughout NSW using best practice guidelines wherever possible.
32. That NSW Health continues to provide resources for clinical governance units to ensure the dissemination and implementation of new clinical guidelines.
33. That the education package and processes about meningococcal disease developed by Dr Duncan Reed of the Gosford and Wyong emergency departments are disseminated for use in NSW.
34. That the staff involved in adverse events and critical incidents, together with the families of those patients involved, be given feedback on the root cause analysis (RCA) and other reports as soon as practicable. This should be done personally and in a sympathetic environment.
35. That meningococcal deaths in young people should be considered severity assessment code one (SAC 1) events under most circumstances, and hence should be the subject of a root cause analysis.
36. That all patients leaving an emergency department either for transfer to a ward or home should have formal documentation of observations immediately prior to transfer and a formal note documented that the patient is fit for transfer or discharge.
37. That hospitals develop processes to identify the senior person in charge in the emergency department, their roles and responsibilities, in medical, nursing and allied health areas.

38. That to ensure adequate handover between shifts there is an efficient and effective system in place involving both nursing and medical staff.
39. That medical and nursing administrators develop a practice of regular ward rounds. Ideally, this should be part of their daily activity to enable them to interact with clinicians at the coalface.
40. That medical officers who are new to an emergency department are given sufficient dedicated time for orientation and induction, and provided with appropriate protocols. This will require some degree of 'backfill' during the time needed for orientation.
41. That NSW Health works with clinicians to re-assess the time at which rotations and secondments change.
42. That there is a safe level of staffing in emergency departments at all times to attend to the expected emergency workload. This may require attention to rostering practices at peak periods, for example, during holiday seasons.
43. That the recruitment, development and employment of clinical nurse practitioners in emergency departments is energetically advanced.
44. That on arrival at the emergency department, patients are first seen and triaged by a health professional.
45. That signage in emergency departments is in accordance with NSW Department of Health guidelines.
46. That given the high degree of mobility among health care workers, all clinical staff in emergency departments are clearly identified and wear uniforms clearly stating their role.

## **1. METHODS AND PROCESS OF REVIEW**

### **1.1 Terms of reference**

This inquiry into hospital administrative and system issues arose out of two patient deaths attributed to meningococcal disease.

One death involved a patient (a child) who initially presented to Shoalhaven Hospital, a facility of the South Eastern Sydney and Illawarra Area Health Service. The other involved a patient who initially presented to Wyong Hospital, a facility of the Northern Sydney and Central Coast Area Health Service.

The review was initiated by the Acting Director General, NSW Department of Health, under section 123 of the Health Services Act 1997 with the following terms of reference:

- (i) to review systems in place for the assessment, diagnosis and treatment of meningococcal disease at the two Area Health Services generally and at Shoalhaven Hospital and Wyong Hospital in particular;
- (ii) to identify any areas for improvements in such policies for the assessment, diagnosis and treatment of meningococcal disease and make recommendations as to any action required to achieve such improvements;
- (iii) in conducting the inquiry, to have regard to existing policies and guidelines for the assessment, diagnosis and treatment of meningococcal disease within NSW Health and in other jurisdictions.

The review was undertaken by the Clinical Excellence Commission in accordance with the terms of section 123(3) of the Health Services Act 1997.

### **1.2 Clinical Excellence Commission Review Team** The Review Team comprised:

Professor Clifford Hughes AO, Chief Executive Officer, Clinical Excellence Commission

Dr Louise Baker, Rural doctor, Cowra, nominated by the NSW Rural Doctors Association

Ms Helen Gosby, Nurse Practitioner, Emergency Department, The Children's Hospital at Westmead

A/Professor Gordian Fulde, Specialist in Surgery and Emergency Medicine, and Director – Emergency Medicine, St Vincent's Hospital, Sydney

A/Professor Denis Spelman, Infectious Diseases Physician and Medical Microbiologist, Alfred Hospital, Melbourne

Ms Donna Waters, Research Fellow, Nursing and Health Services Research Consortium;  
Manager Research, The College of Nursing (Incorporating the NSW College of Nursing)

### **1.3 Methods and process used**

The Review Team visited both the Shoalhaven District Memorial Hospital and the Wyong Hospital. It toured the hospitals, paying particular attention to the emergency departments, and spoke to staff on the floor. It interviewed a wide range of people at both hospitals (see Appendix 1), including members of the emergency department staff and other clinicians<sup>2</sup> involved in the care and treatment of the two patients, executive staff, and key people in the management teams. The Review Team reviewed and discussed the reports of the investigations into each of the two cases with the leaders of those processes. In addition, the next of kin of the two patients were invited to participate in the review process and as a result, several meetings and conversations took place with Professor Hughes.

A selected literature review focused on case notes, documentation provided by NSW Health about the management of infants and children with fever or meningitis, and vaccination policy; documentation provided by each of the hospitals regarding policies, procedures and processes in their emergency departments; the reports of internal and external reviews into the treatment of the patients concerned; and current guidelines and literature on the diagnosis and treatment of meningococcal disease. All medical records were made available in confidence to each member of the Review Team to provide the necessary background.

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<sup>2</sup> Note that the Review Team uses 'clinician' to describe a health professional who is directly involved in the care and treatment of patients.

## 2. BACKGROUND AND CONTEXT

### 2.1 Meningococcal disease<sup>3</sup>

Meningococcal disease is an uncommon disease that affects between 200 and 250 people in NSW each year; less than 1 in 10,000 people (see Table 2.1).

It is a severe infection caused by *Neisseria meningitidis* (also known as meningococcus), a common bacterium that lives at the back of the nose and throat of 5–25% of people without causing any illness or symptoms. *N meningitidis* is spread by secretions from the carrier, often in the fine droplets that are shed through coughing, sneezing and spluttering. Close and prolonged contact is usually needed to pass it from person to person. *N meningitidis* does not seem to spread through saliva or by sharing drinks, food or cigarettes. It does not survive for long outside the human body.

The incubation period can range from one to ten days, and is usually four or five days.

There are several different groups of meningococcus. In NSW, meningitidis serogroup B causes about half the cases of meningococcal disease, and serogroup C causes about one third of cases but two thirds of the deaths (see Table 2.1).

The disease occurs in two main forms or as a combination of these two forms.

*Meningococcal meningitis* occurs when the bacteria infects the outer lining around the brain and spinal cord. It accounts for approximately 80% of cases of meningococcal disease. It shows typical focal symptoms of meningitis. Disease progression is usually gradual; mortality is less than 5%.

*Meningococcal septicaemia*, also known as *meningococcaemia*, occurs when the bacteria invades the bloodstream, causing blood poisoning. The early symptoms of this disease are often non-specific. Onset of the disease and its progression are rapid; it can cause death after even a very short illness. The mortality rate is between 30% and 40%.

Other focal disease resulting from infection with the *N meningitidis* bacteria include septic arthritis, pneumonia, and conjunctivitis. This accounts for less than 5% of cases.

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<sup>3</sup> The NSW Health *Communicable disease factsheet: meningococcal disease* was a major source for this section

**Table 2.1 Prevalence of meningococcal disease in Australia and New South Wales**

NOTIFICATIONS																			
<b>Australia 2003</b>	494 cases (303 isolates + 191 cases confirmed by non-cultural methods)																		
<b>National 2001 &amp; 2002</b>	<ul style="list-style-type: none"> <li>• 1355 notifications of meningococcal disease (2002: 684 cases)</li> <li>• average annual notification rate of 3.5 cases per 100,000 people</li> <li>• clear seasonal pattern, with highest number occurring between June and September</li> <li>• greatest incidence in 0–4 age group (15.4 per 100,000) and 15–24 years (7.3 per 100,000), accounting for 60% of cases</li> <li>• 88 deaths (6.5%) with meningococcal disease. Death rates highest in children under five years</li> <li>• highest notification rate in NT (5.6 per 100,000) over past 5 years, followed by WA, possibly due to the higher proportion of Aboriginal and Torres Strait Islander people.</li> </ul>																		
<b>NSW 1991–2002</b>	<p>Number of cases:</p> <table border="1"> <tr> <td>1991–99</td> <td>over 160 cases per year</td> <td>2002</td> <td>215</td> </tr> <tr> <td>1999</td> <td>221</td> <td>2003</td> <td>198</td> </tr> <tr> <td>2000</td> <td>254</td> <td>2004</td> <td>146</td> </tr> <tr> <td>2001</td> <td>230</td> <td>2005</td> <td>26 (to 25 February 2005)</td> </tr> </table> <p>2000–02: total of 699 cases notified (average 233 cases a year; 3.5 per 100,000). The increase over 1991–99 (average 160+ cases a year; 2.6 per 100,000) is possibly due to new meningococcal strains, better recognition or new diagnostic tests.</p> <p>2000–02 rates by age:</p> <ul style="list-style-type: none"> <li>• less than 1 year 34.4 per 100,000</li> <li>• 1–4 years 11 per 100,000</li> <li>• 15–19 years 9 per 100,000</li> </ul>	1991–99	over 160 cases per year	2002	215	1999	221	2003	198	2000	254	2004	146	2001	230	2005	26 (to 25 February 2005)		
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2000	254	2004	146																
2001	230	2005	26 (to 25 February 2005)																
SEROGROUPS																			
<b>Australia 2002–2003</b>	<p>Serogroup B predominates in children under 5 years in all jurisdictions; and in all age groups other than in Victoria and Tasmania:</p> <table border="1"> <thead> <tr> <th></th> <th>2002</th> <th>2003</th> </tr> </thead> <tbody> <tr> <td>Recorded cases</td> <td>684</td> <td>494</td> </tr> <tr> <td>Serogroup B</td> <td>44%</td> <td>60.4%</td> </tr> <tr> <td>Serogroup C</td> <td>32%</td> <td>32%</td> </tr> <tr> <td>Other serogroups</td> <td>6%</td> <td>?</td> </tr> <tr> <td>Unknown</td> <td>18%</td> <td>?</td> </tr> </tbody> </table>		2002	2003	Recorded cases	684	494	Serogroup B	44%	60.4%	Serogroup C	32%	32%	Other serogroups	6%	?	Unknown	18%	?
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Serogroup C	32%	32%																	
Other serogroups	6%	?																	
Unknown	18%	?																	
<b>NSW 2002–2003</b>	Serogroup B was almost twice as common in NSW as serogroup C: 288 cases (1.5 per 100,000) vs. 155 cases (0.8 per 100,000)																		
<b>Serogroups &amp; mortality</b>	<p>As found elsewhere, in Australia, serogroup C is associated with higher mortality than serogroup B. In 2002:</p> <ul style="list-style-type: none"> <li>• of 222 cases of serogroup C there were 26 deaths</li> <li>• of 299 cases of serogroup B there were 15 deaths</li> </ul>																		
DISEASE & DEATHS IN NSW																			
<b>Disease in NSW 2002–2004</b>	<ul style="list-style-type: none"> <li>• septicaemia (40%), especially in children under 15 years, and males over 65 years</li> <li>• meningitis (38%), especially in people aged 15–64 years</li> <li>• not specified 22%</li> </ul> <p>With group B disease, there is similar incidence of meningitis &amp; septicaemia. With group C disease, septicaemia is more common.</p>																		
<b>Deaths in NSW 2000–2002</b>	<ul style="list-style-type: none"> <li>• 40 deaths from meningococcal disease in NSW (5.8% of cases)</li> <li>• higher death rate in males, older adults, patients from rural NSW, and patients with serogroup C infection and septicaemia</li> </ul> <p>There were significant associations between septicaemia (RR 2.8); serogroup C (RR 2.7); age 45–64 (RR 2.3)</p>																		

Principle sources: *Communicable Diseases Intelligence*, 2004; Vol 28 Supp 2; NSW Health: *Public Health Bulletin* March 2004 *Meningococcal Disease. Communicable Disease Fact Sheet* NSW Health 1 Oct 2004

### 2.1.1 Clinical presentations

Meningococcal infection can present a spectrum of clinical pictures from mild, apparently benign disease to overwhelming sepsis with shock.

#### Early disease

Symptoms may be non-specific, especially early in the illness, making the precise diagnosis difficult. Clinical features may include fever, myalgia (muscle pain) and chills.

In children especially, meningococcal disease may present with less specific symptoms, including irritability, difficulty waking, vomiting, unusual crying, and refusal to eat, or as a pale, unwell child without the clinical features of either meningitis or the characteristic rash.

The clinical pattern in young children may also be atypical because headache and neck rigidity are frequently absent.

#### Difficulty with early diagnosis

Diagnosis at an early stage can be difficult for several reasons:

- the early stages of meningococcal disease can be similar to a benign viral infection
- early in the disease a rash may be absent or may be a blanching macular rash rather than the more typical petechial rash of red–purple spots or bruises. Also, it may be more difficult to recognise this in individuals who have dark skin
- the laboratory findings in the early stages of meningococcal disease may be non-specific and unremarkable.

It is important that all patients be advised to seek early clinical review if their symptoms deteriorate.

Problems in detecting the disease in its early stages have been noted in various medical journals and texts, for example:

**The New England Journal of Medicine<sup>4</sup>**

*‘One of the challenges of diagnosing meningococcal disease is its clinical manifestations are difficult to distinguish from those of common but less serious illnesses.’*

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<sup>4</sup> Rosenstein et al. 2001

### **The Infectious Disease Clinic of North America<sup>5</sup>**

*'In most cases, the earliest symptoms of meningococcal infection are indistinguishable from those of trivial viral infections and other minor illnesses.'*

### **Harrison's Principles of Practice of Internal Medicine 15th Edition<sup>6</sup>**

*'Few clinical clues help the physicians distinguish the patient with early meningococcal disease from patients with other acute systemic infections.'*

## **Meningitis**

Classical features of meningitis include fever, headache, vomiting, photophobia, and neck stiffness.

The characteristic rash is a purpuric or petechial rash occurring on the limbs and /or the trunk.

Features of severe central nervous system infection can rapidly follow: confusion, drowsiness or deterioration in conscious state, agitation, fitting and focal neurological signs.

There are many symptoms of meningococcal disease, although a few are especially important. Symptoms could include sudden onset of fever, headache, tiredness, neck stiffness, joint pain, petechial rash, dislike of bright lights, vomiting and nausea.

## **Meningococemia**

The clinical pattern of meningococemia is varied.

- After a few days of upper respiratory symptoms, there may be the abrupt onset of fever, often after a chill. Malaise, weakness, myalgias (muscle pains), headache, nausea, vomiting, and arthralgias (joint pains) are frequent presenting symptoms.
- A petechial or purpuric skin rash (of red–purple spots or bruises) is the characteristic manifestation. The skin rash may advance from a few ill-defined lesions to a widespread petechial eruption within a few hours.

**Fulminant meningococemia** is the most serious form of meningococcal disease. It occurs in approximately 5–15% of cases of meningococcal disease.

- It begins abruptly with a high fever, chills, myalgias, weakness, nausea, vomiting, and headache. Apprehension, restlessness, and frequently, delirium occur within the next few hours.
- The rash appears suddenly and is widespread, purpuric, and ecchymotic (bruise-like).

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<sup>5</sup> Keith and Cartwright 1999

<sup>6</sup> Braunwald et al. 2001

**Chronic meningococemia** is a rare form of meningococcal disease. This is an intermittent bacteremic illness that lasts from at least one week to as long as several months.

- The fever tends to be intermittent, with afebrile periods ranging from two to ten days, during which the patient seems entirely healthy. As the disease progresses, the febrile periods occur more frequently, and the fever may become continuous.
- Eventually, a skin eruption or some other manifestation of meningococcal disease appears during a febrile episode.

### **2.1.2 Diagnosis**

Regrettably, there is no simple, single, quick blood test that can be done in these clinical settings to provide a definitive and rapid diagnostic answer.

An elevated peripheral blood white cell count is suggestive of bacterial infection, but not specific for meningitis. Cultures of cerebrospinal fluid and blood may take 24 to 48 hours to confirm a diagnosis of meningococcal meningitis.

Early recognition of meningococcal disease depends on the clinical suspicion. Early diagnosis of sporadic cases can be difficult unless there is high awareness of the problem in the community and among health care providers.<sup>7</sup> Diagnosis is based on the patient's symptoms and signs. Confirmation involves laboratory testing of samples from the ill patient, including:

- blood for culture, nucleic acid testing (NAT)
- spinal fluid for microscopic examination, culture, and/or NAT
- skin affected by a rash, for examination, culture or NAT, although the last is rarely performed

### **2.1.3 Treatment**

Effective management of meningococcal infection requires early intervention, effective antibiotic therapy and careful attention to associated manifestations such as shock and coagulopathy.

Based on the *Guidelines for the early clinical and public health management of meningococcal disease in Australia*<sup>8</sup>:

- if a patient has clinical signs or symptoms suggestive of invasive meningococcal disease (meningitis or septicaemia) they should immediately be given intravenous antibiotics

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<sup>7</sup> Patel et al. 1997. See also NSW Health circular 2004/60: *Acute management of infants and children with bacterial meningitis*, page 9

<sup>8</sup> <[www.seniors.gov.au./internet/wcms/publishing.nsf/Content/cda-pubs-other-mening.htm](http://www.seniors.gov.au./internet/wcms/publishing.nsf/Content/cda-pubs-other-mening.htm)>

- it may be appropriate to defer lumbar puncture
- therapy should not be delayed while awaiting results of diagnostic tests, such as a lumbar puncture or computed tomography (CT) scan
- the local public health unit should be notified immediately so that a public health response can be determined
- all patients with reasonably suspected meningococcal infection should have blood and a throat nasopharyngeal swab collected as soon as possible for culture, and blood for neutrophil and platelet counts and serological studies. If petechiae (tiny localised haemorrhages from the small blood vessels just beneath the surface of the skin) are present or if frank bleeding is evident, formal coagulation studies should be undertaken
- penicillin treatment alone will not reliably eliminate nasopharyngeal carriage of *N meningitidis* and the patient will require treatment to clear organisms from the throat (see below — *Management of contacts* — for the antibiotics used).

#### Empirical therapy (before hospital admission)<sup>9</sup>

When meningococcal infection is suspected clinically, immediate empirical antibiotic therapy is indicated, before formal diagnosis, transfer to hospital or identification of an organism. This is particularly important in patients with signs of a haemorrhagic disease or actual incipient shock. However, to confirm the clinical diagnosis, blood for culture should be collected before the antibiotic is given, when this is possible without delaying treatment. The blood specimen should accompany the patient to hospital.

At present, nearly all the meningococcal isolates are sensitive to penicillin, but as other invasive pathogens may cause meningitis symptoms similar to those of meningococcal meningitis (including a petechial rash), an antibiotic active against the common causes of meningitis is preferable.

All antibiotics should be given intravenously, unless intravenous access cannot be obtained.

#### Hospital therapy<sup>10</sup>

**Antibiotic treatment:** there should be no delay in starting or continuing treatment after hospital admission. Initial hospital therapy should be with ceftriaxone or cefotaxime, usually with benzylpenicillin. Therapy can then be modified depending on culture and sensitivity results. It should be continued for at least five days and, if meningitis is proven or probable, for at least five days after resolution of fever.

**Preventing transmission:** respiratory isolation of the patient is recommended for 24 hours after starting chemotherapy. The patient should also be given the appropriate antibiotic before

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<sup>9</sup> Based on Patel et al.

<sup>10</sup> As above

discharge if treatment did not include an antibiotic that eradicates nasopharyngeal carriage of *N meningitidis*.

### Diagnostic tests

In patients with reasonably suspected meningococcal infection, therapy should not be delayed while awaiting results of diagnostic tests (such as computed tomography). With the emphasis on antibiotic therapy before hospital admission, opportunities to prove a diagnosis by culture may decrease, increasing the importance of other diagnostic tests such as NAT.

### Management of contacts

Close contacts of patients with invasive meningococcal disease are at increased risk. The risk of disease among close contacts can be reduced by drug therapy commenced as soon as possible.

The widely used *Australia Therapeutic Guidelines Antibiotic*<sup>11</sup> gives the following advice:

Chemoprophylaxis for meningitis or other invasive infections caused by *Neisseria meningitidis* (meningococcus) ... is offered to close (usually household) contacts of the index case. Among close contacts there will be a person or persons asymptotically carrying the organism which caused the index infection. Chemoprophylaxis aims to eradicate asymptomatic carriage in the network of contacts so that susceptible members of the group do not acquire the organism and get an invasive infection. Despite prophylaxis, disease can still occur. Parent education regarding frequent, careful observation and the need for examination by a medical practitioner at the first signs of any unexplained illness is essential. The *Guidelines for early clinical and public health management of meningococcal disease in Australia*<sup>12</sup> provide definitions of a close contact, and appropriate prophylactic regimens. See also the *Australian Immunisation Handbook*.<sup>13</sup> Prophylaxis outside the immediate family should be initiated and coordinated by public health authorities.

*Neisseria meningitidis* (meningococcus)

Suitable regimens for prophylaxis are

- ceftriaxone (child: 125 mg) 250 mg IM, as 1 dose (preferred option during pregnancy)

OR

- ciprofloxacin 500 mg orally, as 1 dose (preferred option for women taking oral contraceptives)

OR

- rifampicin (neonate <1 month: 5 mg/kg; child: 10 mg/kg up to) 600 mg orally, 12-hourly for 2 days.

Rifampicin is associated with multiple drug interactions and is contraindicated in pregnancy, alcoholism and severe liver disease.

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<sup>11</sup> Version 12, 2003, page 45

<sup>12</sup> <[www.seniors.gov.au/internet/wcms/publishing.nsf/Content/cda-pubs-other-mening.htm](http://www.seniors.gov.au/internet/wcms/publishing.nsf/Content/cda-pubs-other-mening.htm)>

<sup>13</sup> <[www.immunise.health.gov.au/handbook.htm](http://www.immunise.health.gov.au/handbook.htm)>

## Identification and management of an outbreak

An outbreak of meningococcal disease is a public health crisis that calls for a rapid coordinated public health response.

### **2.1.4 Outcomes<sup>14</sup>**

In most cases, with early diagnosis and prompt treatment, outcomes of meningococcal disease are good. Approximately 60% of patients will recover completely, although symptoms such as fatigue and headache may persist for months after the acute illness.

Some 30% of patients will survive with disability. Complications of meningococcal disease include brain injury, hearing loss, seizures and amputation. Deafness is the single most common permanent deficit in survivors of meningococcal meningitis, occurring in 4–6% of survivors. Permanent motor deficits, retardation and hydrocephalus occur in less than 1% of survivors. A significant proportion of survivors will have tissue damage that requires surgical treatment, such as skin grafts, or partial or full amputation of limbs.

Five to ten per cent of patients with meningococcal disease die, despite rapid treatment. Fulminant meningococemia has the highest mortality rate; it can exceed 50% despite the use of appropriate antibiotic therapy. It can be as high as 70% in developing countries. Meningococcal meningitis without antibiotic therapy is a uniformly fatal disease.<sup>15</sup>

### **2.1.5 Who is at risk?**

While the disease can affect anyone, those at most risk include:

- household contacts of patients with meningococcal disease
- small children aged less than five years, and adolescents and young adults aged 15 to 24
- people exposed to cigarette smoke and/or environmental dust
- travellers to countries with high rates of meningococcal disease, such as sub-Saharan Africa, or those taking the Hajj pilgrimage to Saudi Arabia
- people with no working spleen (e.g. asplenia or hyposplenia) or who have certain other rare medical conditions
- laboratory workers

Meningococcal disease occurs more commonly in winter and early spring.

## **2.2 Vaccines**

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<sup>14</sup> This section is based on *Guidelines for the early clinical and public health management of meningococcal disease in Australia*

<sup>15</sup> Hoffman 2004

There are two available vaccines:

- Quadrivalent (A,C,Y,W135) polysaccharide vaccine (4v.MenPv), which protects against groups A, C, Y and W135 for two to five years. It is ineffective in children aged less than 2 years. This vaccine is recommended for:
  - travellers to countries where there are epidemics or increased incidence of meningococcal disease, for example sub-Saharan Africa
  - people travelling to the Hajj in Saudi Arabia (where it is a requirement).
- The recently available serogroup C conjugate vaccine (Men CCV), which protects against meningococcal group C disease for many years. Conjugate serogroup C vaccines were approved for use in Australia in 2001 and a national campaign targeting children 1–18 years was announced in 2003.

During 2003 and 2004, this vaccine has been offered via a free school-based system to all NSW school children. From June 2004, 15–19 year olds who do not attend school can obtain free vaccine from their GP. The vaccination schedule is as follows:

- infants under 12 months of age receive three doses: 2, 4 and 6 months
- infants between 4 and 11 months receive two doses
- children 12 months and older require only one dose

Both vaccines should be given to:

- laboratory workers dealing with *N meningitidis*
- people without a working spleen and with certain other medical problems.

There is no one vaccine that is effective against all strains of meningococcal disease. Therefore, because vaccines do not protect against the more common meningococcal group B disease, vaccinated people must still be alert for meningococcal disease.

### 3. EARLIER INVESTIGATIONS

Various reviews have been conducted into the two cases that presented to the Shoalhaven and Wyong Hospitals.

#### 3.1 Shoalhaven Hospital

Root cause analysis (RCA) is an incident investigation technique that is widely used in industry and health care to identify the causes of incidents and to guide the development of preventative strategies. Both internal and external RCAs were conducted for the case at Shoalhaven Hospital.

RCAs, despite their name, rarely uncover a single ‘root’ cause. In the cases reviewed, it could be said that such a root cause was the rapidly overwhelming infection each patient contracted. However, RCAs do provide the opportunity to identify factors that, if acted upon, may reduce the risk for other patients in the future.

Recommended actions from the RCAs conducted at Shoalhaven Hospital to help in managing future presentations of potential cases of meningococcal disease included the following:

- Educate medical staff about the diagnosis and early management of meningococcal disease.
- Institute a system for indicating that certain presentations to the emergency department automatically require a consultation with at least the most senior medical officer on site and/or the on-call paediatrician; specifically a stamp process indicating *Re-presentation. Must be discussed with an experienced paediatric practitioner.*
- Clearly identify and communicate the most senior medical officer on duty for each shift.
- Institute a policy that ensures that the most senior clinician is consulted and assumes primary responsibility for management of paediatric presentations.
- Continue and enhance the education and communication systems provided by paediatricians to medical staff in the emergency department.
- Develop a questionnaire to be completed by all locum agency staff to ensure the appropriate allocation of medical staff to senior and junior roles on the roster for each shift in the emergency department.
- Review nursing rostering and skill mix in relation to paediatric nursing care.
- Explore the feasibility of commissioning the paediatric assessment and treatment area that was included in the redevelopment of the emergency department.

- Educate nursing staff about recording observations, the responsibility to apply department policy, and mechanisms to escalate any concerns.
- Provide education and reinforcement regarding the responsibilities of medical and nursing staff for reporting adverse events in a timely way.
- Medical and nursing staff are to welcome the authority of nursing staff to raise concerns if local guidelines or policy are not being followed. Senior staff are to promote culture and adopt NSW Health communication strategies, tools and training as they are made available.
- Appoint a medical manager to the emergency department.

## **3.2 Wyong Hospital**

At Wyong Hospital, a reportable incident brief was completed and two reviews conducted. The first of these was a chart review (i.e. of the patient's medical records); the second was a 'patient review' (i.e. a review of patient management) by the Area Director of Emergency Services. No RCA was done.

## **3.3 Assessment**

The Review Team read the medical records of both patients in detail. The records raised no concerns that have not already been addressed in the patient reviews and the RCAs.

In both cases, from discussions with the patient's families, the Review Team understands that they were unaware of the results of these processes. The information should be conveyed to them by administration.

In the case of the RCA conducted at Shoalhaven Hospital, the processes were detailed and complete; the recommendations and proposed actions were comprehensive. The Review Team agrees with the recommendations and has nothing to add to the process that took place.

In the case of Wyong Hospital, the Review Team assessed the documentation and interviewed the relevant personnel. Although the Review Team recognises that two reviews had been performed and a reportable incident brief completed, this incident would have been better managed with a formal root cause analysis.

This team has no argument with the finding of either the chart review or the patient review but feels that, given the sensitive nature of meningococcal disease in young people, the fatal outcome of the event and the likelihood of repeated episodes of meningococcal disease, it would have been appropriate to classify this case as a severity assessment code (SAC) I event and, therefore, to have done a root cause analysis. Furthermore, a root cause analysis would have more clearly demonstrated the transparent nature of the reviews undertaken at Wyong Hospital.

## **4. SHOALHAVEN DISTRICT MEMORIAL HOSPITAL**

### **4.1 Background**

The Shoalhaven District Memorial Hospital in Nowra is the district hospital for the Shoalhaven region. It is a 141-bed, acute, Level 4 hospital providing emergency, surgical, elective orthopaedic and plastic surgery, medical, intensive care, obstetric, gynaecology, paediatric, neonatal care and renal services. Shoalhaven Hospital is also linked to the area-wide Rehabilitation and Extended Care Service. The hospital has been substantially rebuilt in recent years. It serves a population of around 88,000, which can grow to as many as 320,000 in peak holiday season.

The Shoalhaven Hospital emergency department is the major trauma centre for the Southern Shoalhaven region. It saw 28,863 patients in 2004, an increase of 1100 over the previous year. Twenty five percent of presentations are children. Since March 2004, the emergency department has occupied a new purpose-built space that is well planned and well equipped. A medical director of the emergency department was appointed approximately two months ago and works two days a week.<sup>16</sup>

The Shoalhaven Hospital is part of the South Eastern Sydney and Illawarra Area Health Service (SESIAHS), an amalgamation of the South Eastern Sydney and Illawarra Area Health Services that took effect on 1 January 2005.

Wollongong Hospital, which is also part of the SESIAHS, is the principal teaching and referral hospital for the Illawarra and Shoalhaven and the base for the region's trauma services. It provides the rostered medical officers (career medical officers — CMOs) and locums to staff the Shoalhaven emergency department. Locums are recruited from agencies. Historically, the department has been supported by senior medical officers who work across the region and in the emergency department for blocks of time. It can be difficult to staff the department at weekends and during school holidays, especially as registrars leave during the school holidays and visiting medical officers (VMOs) are on leave. During these busy periods, the department depends more than ever upon itinerant locums. For example, in the December 2004 – January 2005 holiday break, the department had 16 locums.

Until October 2004, there was a central rostering system for emergency department medical officers, including use of agency staff as required. This system was followed by a period of flux; and in particular, a great deal of uncertainty since September/October 2004. The new Area Health Service structure was introduced on 1 January 2005. From October last year until recently there has been no medical director in the emergency department.

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<sup>16</sup> Illawarra Health Annual Report 2003–2004, page 27

The Review Team was told that at present, the relationship between the Shoalhaven and Wollongong Hospitals is not clear.

Nowra itself is the largest coastal town on the NSW south coast; a regional centre with a fast growing population. It is the business and administrative capital of the Shoalhaven region and a popular holiday destination for Sydney and Canberra residents.

The population residing in the Illawarra is more socio-economically disadvantaged in terms of education level, occupation, or areas of socio-economic disadvantage, compared to the NSW average. Within the region there is a range of disadvantage, with the Shoalhaven and Shellharbour local government areas being the areas of high disadvantage.

The population profile of the Shoalhaven region shows a higher proportion of children, older residents and Aboriginal people than the state and Illawarra average. This means that a high proportion of people are on low incomes or not in the workforce. Residents are also affected by a limited public transport system.

There is also a shortage of general practitioners in the region and the problem is compounded in Nowra by the lack of general practitioners who bulk bill. There is a long wait to see a general practitioner and a major lack of after-hours care for patients, other than the public hospital.<sup>17</sup>

A needs assessment conducted by the Shoalhaven Division of General Practice identified a range of problems, including:

- a shortage of general practitioners
- lack of bulk billing
- long waiting lists at public hospital
- lack of access to allied health services
- drug and alcohol abuse
- lack of mental health services, especially after hours

The absence of general practitioners who bulk bill means that the Shoalhaven Hospital emergency department is used as a substitute general practice. Psychosocial aspects of patient care are important, with some of the department's services built around the NSW Department of Community Services, and mental health support services.

All of these factors, individually or combined, can have an effect on the emergency department's ability to assess, diagnose or treat possible cases of meningococcal disease.

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<sup>17</sup> Shoalhaven Division of General Practice — Planning summary for the year 2004–2005

## **4.2 Findings of the Review Team**

### **4.2.1 Positives**

The Review Team identified many positive points about the emergency department at the Shoalhaven Hospital:

- A new purpose-built department with a resuscitation bay
- Dedicated designated nursing and allied health staff
- A new medical director has been appointed for the emergency department, for two days a week
- Paediatric policies are sound and in place and consistent with state and national guidelines
- Presence of paediatricians who are available and keen to attend for patient review
- Skilled social workers
- Changes have already been made since the RCA recommendations, for example, there is a process to stamp the files of children re-presenting to the emergency department
- 24-hour pathology is available
- There is thorough orientation for new nurses into the department, followed by a comprehensive training/professional development package
- The nurse unit manager has started to email briefing material to new doctors who will be working in the department
- There is a waiting list of nurses who want to work in the department

### **4.2.2 Areas for improvement**

The Review Team identified a number of areas that could be improved in order to enhance the capacity of the Shoalhaven Hospital emergency department to assess, diagnose and/or treat potential cases of meningococcal disease:

- The Shoalhaven Hospital emergency department needs better supervision and leadership
- There is a need for administration support and involvement in clinical programs
- Continuity and supervision by senior medical staff together with improved lines of communication to senior staff on call
- There could be better formal communication between medical and nursing staff in the emergency department, especially at the end of shifts

- The newly appointed director of the emergency department will need to focus on team building, communication, and resource management
- There is a need for administration support and involvement in clinical programs
- The emergency department staff is concerned that the administration is not aware of coalface issues in the department
- Shortcomings in orientation for new doctors, a manifestation of both teething problems and gaps in clinical leadership
- Rapid turnover and locum coverage require improved systems for orientation and induction to the emergency department
- There is no specific paediatric facility to observe a sick child for a specified period of time in the emergency department
- There is a significant problem in accessing beds at the Shoalhaven Hospital. It is of a similar order to the major hospitals in Sydney. This affects work practices and patient care. The access problem is particularly acute during the holiday period when the local population increases by a factor of three.
- Communication of protocols and procedures to all staff (in particular paediatric protocols)
- Specific orientation concerning paediatric protocols and procedures
- If all elective admissions are to be processed through the department, there needs to be adequate resourcing for this extra workload, particularly in peak seasons
- The lack of feedback following reviews — while the internal and external review processes (RCAs) have been sound, the staff at the coalface still do not know the results of them
- The first person a patient sees on arriving at the emergency department can be a clerical staff member rather than a health professional

## 5 WYONG HOSPITAL

### 5.1 Background

The Wyong Hospital is part of Northern Sydney Central Coast Health (NSCCH), which cares for the people of the Northern Sydney and Central Coast regions.

Gosford is the administrative hub of the NSCCH area, and the Gosford Hospital is the principal referral hospital on the Central Coast. Both Gosford and Wyong Hospitals have been undergoing substantial redevelopment programs over the past few years. The Wyong Hospital project, which began in 2003, has been designed to double the hospital in size to enhance its status as a major acute care facility. When fully operational, the hospital will have 319 beds (this includes 14 nursery cots).<sup>18</sup> It has grown from a 50-bed community hospital to approximately 245 beds in April 2005. The Wyong Mental Health Centre is also located at Wyong Hospital. This 50-bed facility will triple the number of mental health beds available on the Central Coast. It comprises an older person unit, an adult acute mental health unit, and a high-level observation unit.

The emergency department at the Wyong Hospital has not yet been rebuilt. It is accommodated in an older part of the hospital, with an additional 14 beds provided in a demountable building that was opened mid-2004. The current layout of the department is difficult and opposes a range of problems that affect work practices. It is anticipated that the new department will be in use by the end of 2006.

The Review Team was told that the emergency department is the ninth busiest in New South Wales and by far the busiest of its peer group. It has grown very quickly from around 26,000 presentations to 37–39,000. For example, in 2004, the department saw 39,000 patients, 10,000 of whom were paediatric, more than were seen by the Gosford Hospital emergency department. There is no paediatric unit at the Wyong Hospital, rather, paediatric patients are given initial treatment at Wyong then transferred to Gosford if they need to be observed or require further care. The two hospitals are approximately 40 minutes apart by car.

There is a mental health team based in the emergency department for 16 hours a day. Dealing with mental health patients, in particular when the mental health team is not in the department, places an additional strain on an already stretched emergency department.

There is a 20-bed short-stay observation ward but no funding to open it. It includes four monitored beds and four paediatric beds.

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<sup>18</sup> MEDIA RELEASE: *Go behind the scenes at the new Wyong Hospital 1 February 2005*  
<[www.health.nsw.gov.au/areas/ccahs/mediarel/pdf/Previewmediareleasefinal.pdf](http://www.health.nsw.gov.au/areas/ccahs/mediarel/pdf/Previewmediareleasefinal.pdf)>

Rosters for resident medical officers (RMOs), junior medical officers (JMOs) and locums are run from Gosford Hospital. There is a problem in recruiting medical staff, which presents issues for staffing the department at weekends, and in particular, providing adequate senior cover. The itinerant workforce is most in evidence when the department is under the most stress, that is, during holidays when some VMOs are on leave.

The hospital would like its emergency department to be accredited as a Level 4 training facility, which would help it attract staff, but this will depend on factors such as the hospital having coronary care and high dependency units. At present it has neither.

The Central Coast is one of the fastest growing areas in the state. It has two local government areas: Wyong Shire Council and Gosford City Council.

Wyong Shire is one of the highest population growth areas in Sydney's outer ring and its population is expected to equal that of Gosford by 2021. Most of the region's households comprise two-parent families, followed by couples without offspring, and lone persons. The region has a distinct skew towards unskilled and semiskilled people. This is particularly evident in Wyong Shire.<sup>19</sup> With its large caravan park and temporary home population, it is also significantly socio-economically poorer than Gosford City. Service infrastructure of the area lags well behind the massive urban development that has occurred over the past decade.<sup>20</sup>

According to the Central Coast Division of General Practice, access to primary care services, particularly general practice, is a major issue on the Central Coast. The population has increased by 19% over the past ten years, with a corresponding 18% decline in general practitioners. This automatically creates pressures on access. The shortage is accentuated by the fact that as a retirement area, the Coast has a higher proportion of population aged 65 years and over compared to the rest of NSW (Central Coast – 18%; NSW – 12%) and this group is a high user of health resources. The other major issue that affects access is the major decline in bulk billing rates (75% in 1998–99, 53% in 2002–03).<sup>21</sup>

All these factors put pressure on the emergency department: the fast growth in the catchment area and its socio-economic profile, the number of young families, the shortage of general practitioners, the difficulties in recruiting medical staff, the physical properties of the department, and so on. Such factors, combined with the multitude of other related activities that the emergency department is involved in (including obstetrics, neonatal care, and psychiatry), means there is a danger that any meningococcal case could be attended to less quickly because the doctors are busy elsewhere in the hospital.

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<sup>19</sup> [www.tuggerahregion.com.au/characteristics.html](http://www.tuggerahregion.com.au/characteristics.html)

<sup>20</sup> NSW Central Coast Division of General Practice — Planning summary for the year 2004–2005

<sup>21</sup> As above

## 5.2 Findings of the Review Team

### 5.2.1 Positives

The Review Team identified many positive points about the emergency department at the Wyong Hospital that enhance its ability to cope with potential cases of meningococcal disease.

- Emergency department management and hospital responses to the incident in question were good
- A new emergency department is being built and it is anticipated that it will open by the end of 2006
- There is a very good relationship between the Gosford Hospital and Wyong Hospital emergency departments
- The emergency department appears to run well and is well networked with Gosford Hospital
- There are excellent professional development pathways for the nursing staff
- Communication within the emergency department is good, for example, there are combined medical and nursing rounds
- The doctors and nurses appeared to work well together
- There is an area-wide orientation programme for new nursing and medical staff
- The media was handled well in the incident in question, with a single clinician appointed as spokesman and able to deliver a consistent message in a timely way. This meant that on the whole, the dissemination of inaccurate information about meningococcal disease was not a significant factor in the media reports.
- Dr Duncan Reed of the Gosford and Wyong emergency departments has developed an excellent education package about meningococcal disease. It has been run off campus, in the community. Special courses have been run for nursing staff.
- RMOs receive a day of dedicated orientation, during which their positions are back filled
- Emergency department policies are available on the hospital intranet
- There is a waiting list of nursing staff who want to work in the emergency department

### **5.2.2 Areas for improvement**

The Review Team identified a number of areas that could be improved in order to enhance the capacity of the Wyong Hospital emergency department to assess, diagnose and/or treat potential cases of meningococcal disease:

- The layout of the current emergency department works against best practice, good communication and efficient use of resources.
- The triage area is physically separated from the rest of the emergency department, posing safety and communication concerns.
- There is a very limited communication system between the triage nurse and the rest of the emergency department. This means that if the triage nurse needs assistance in moving a sick patient, for example, he or she has to leave the desk to find support.
- There are not enough medical staff to cover both the emergency department and the multitude of other related activities that the department is involved in, including obstetrics, neonatal care, and psychiatry. There is also a supervision issue arising out of the availability of senior staff.
- It is a very busy department with a relatively junior medical staff (Interns, RMOs 1 and 2).
- There are safety issues regarding the handling of mental health patients, particularly after 10 p.m. There is no permanent security officer in the emergency department. Waiting mental health patients are seated behind the triage nurse.
- The emergency department sees 10,000 paediatric patients a year (approximately one third of all presentations to the department) but has no paediatric unit/ward, and all admissions have to be transferred to Gosford Hospital.
- It is difficult to identify clinical roles because of the similarities in uniforms.
- The transient workforce means that in many instances, it is not possible to establish easy relationships between clinical staff.
- Critical incident debriefing and support was strong for the medical staff after the incident in question — it was mostly informal and provided by friends and colleagues. While the nursing unit manager looked after the nursing staff, greater involvement of the nursing administration is needed (for example, the needs of the day staff were addressed but the night staff can and did miss out).
- In retrospect, this particular case could have been coded as a SAC I event.
- While the chart and patient review were adequate, it would have provided greater transparency and clarity of process if the RCA route had been adopted

## 6. RECOMMENDATIONS

### 6.1 Recommendations specific to Shoalhaven Hospital

1. That Shoalhaven Hospital develops a process to clearly identify the senior person in charge of the emergency department in both medical and nursing teams at any particular time. Clear job descriptions indicating roles and responsibilities should be available.
2. That the hospital's executive staff work with the newly appointed director of the emergency department in reviewing leadership roles, responsibilities and resources.
3. That there is a joint meeting of the emergency unit medical and nursing staff at the hand over to the next shift.
4. That Shoalhaven Hospital runs teambuilding exercises that focus on training clinical staff to communicate potential concerns to other members of the team, especially between nursing and medical disciplines.
5. That medical and nursing hospital administrators do a round of wards, including the emergency department, on most days. Given that the hospital is in a growth phase, and given the current reorganisation of the health system into super regional areas, it is particularly important that hospital administrators are more intimately involved at the coalface.
6. That the person who is appointed to the recently funded position of director of medical education is a practising clinician.
7. That NSW Health continues to provide resources for the hospital's administration to be involved in the dissemination, implementation and resourcing of new guidelines, including national and state guidelines and local protocols, through the Clinical Governance Unit and patient safety managers of the Area Health Service.
8. That Shoalhaven Hospital develops and implements a system that will provide all new doctors working in the emergency department with dedicated time for orientation. During this time the emergency medical officer positions should be covered.
9. That the four-bed paediatric unit in the emergency department is opened and resourced to create four additional paediatric beds for priority use for paediatric presentations, including short-stay observations of paediatric patients with concerning clinical signs.
10. That an internal working party that includes emergency department doctors and nurses and local paediatricians is created to finalise protocols, controls and policies for the use of the four-bed paediatric unit in the emergency department.

11. That there is adequate staff to cover both emergency department work and elective admissions, which also pass through the department.
12. That the recruitment, development and employment of clinical nurse practitioners in the emergency department is energetically advanced.
13. That signage in the emergency department is in accordance with NSW Health guidelines.
14. That on arrival at the emergency department, patients are first seen and triaged by a health professional.
15. That feedback on the results of internal and external reviews is done in a timely way for all staff involved in the incident under review.
16. That the staff, and the family of the patient involved, be given personal feedback on the root cause analysis (RCA) and this report as soon as possible, preferably face to face.

## **6.2 Recommendations specific to Wyong Hospital**

17. That the physical layout of the current emergency department needs to be addressed urgently.
18. That clinicians remain actively involved in planning for the new Wyong Hospital emergency department.
19. That there is a safe level of staffing in the emergency department at all times to attend to the emergency patients coming in the door.
20. That there are two separate after-hours rosters, one for medical staff in the emergency department and the other for medical staff in the general hospital.
21. That there are appropriate processes and staffing in place to cover clinical staff when they are outside the department, especially for administration duties, such as attending meetings at Gosford Hospital.
22. That there is increased accessibility to trained Mental Health Unit staff to work with the emergency department in the initial assessment and subsequent admission of mental health patients.
23. That the additional paediatric beds in the short-stay ward are opened and the necessary nursing education in paediatric care, and paediatric support and resourcing, are provided.
24. That the ambulatory paediatrics service is developed, adequately resourced and staffed, at the same time that the additional paediatric beds in the short-stay ward are opened.
25. That some dedicated high-dependency areas are opened and suitably staffed for observation of appropriate patients (e.g. coronary patients).

26. That the emergency department is provided with greater ancillary support, noting that units in other hospitals have resources such as an aged care assessment team, nurse educators, social workers, and mental health workers.
27. That all clinical staff wear clear visual identification of their roles.
28. That the staff, and the family of the patient involved, be given feedback on the chart and patient review, and this report, as soon as possible.
29. That the root cause analysis (RCA) route could provide greater transparency and clarity of process in the review of fatal cases of meningococcal disease in young people.

### **6.3 General recommendations**

The Review Team noted that some recommendations could have wider applicability to other institutions throughout NSW Health. The following should be disseminated for discussion and action within all Area Health Services.

30. That statewide guidelines be developed to offer children opportunistic vaccination at the site of clinical contact, particularly at institutions where the emergency department fills the role of the primary carer for a significant proportion of the population.
31. That given the high degree of mobility of health care workers, especially medical staff within tertiary and secondment hospitals, emergency department policies and procedures be standardised throughout NSW using best practice guidelines wherever possible.
32. That NSW Health continues to provide resources for clinical governance units to ensure the dissemination and implementation of new clinical guidelines.
33. That the education package and processes about meningococcal disease developed by Dr Duncan Reed of the Gosford and Wyong emergency departments are disseminated for use in NSW.
34. That the staff involved in adverse events and critical incidents, together with the families of those patients involved, be given feedback on the root cause analysis (RCA) and other reports as soon as practicable. This should be done personally and in a sympathetic environment.
35. That meningococcal deaths in young people should be considered severity assessment code one (SAC 1) events under most circumstances, and hence should be the subject of a root cause analysis.
36. That all patients leaving an emergency department either for transfer to a ward or home should have formal documentation of observations immediately prior to transfer and a formal note documented that the patient is fit for transfer or discharge.
37. That hospitals develop processes to identify the senior person in charge in the emergency department, their roles and responsibilities, in medical, nursing and allied health areas.

38. That to ensure adequate handover between shifts there is an efficient and effective system in place involving both nursing and medical staff.
39. That medical and nursing administrators develop a practice of regular ward rounds. Ideally, this should be part of their daily activity to enable them to interact with clinicians at the coalface.
40. That medical officers who are new to an emergency department are given sufficient dedicated time for orientation and induction, and provided with appropriate protocols. This will require some degree of 'backfill' during the time needed for orientation.
41. That NSW Health works with clinicians to re-assess the time at which rotations and secondments change.
42. That there is a safe level of staffing in emergency departments at all times to attend to the expected emergency workload. This may require attention to rostering practices at peak periods, for example, during holiday seasons.
43. That the recruitment, development and employment of clinical nurse practitioners in emergency departments is energetically advanced.
44. That on arrival at the emergency department, patients are first seen and triaged by a health professional.
45. That signage in emergency departments is in accordance with NSW Department of Health guidelines.
46. That given the high degree of mobility among health care workers, all clinical staff in emergency departments are clearly identified and wear uniforms clearly stating their role.

## **CONCLUSION**

The Review Team was impressed by the dedication and hard work of the staff, and their willingness to cooperate with the internal and external review processes, including this review. They have a great desire for feedback on these processes and on this report. We support this wholeheartedly.

## APPENDIXES

### 1. List of people interviewed

#### ***Wyong Hospital***

- General Manager, Wyong Hospital
- Director, Clinical Governance Unit, Northern Sydney Central Coast Health
- Director, Medical Services, Wyong Hospital
- Director, Nursing Services, Wyong Hospital
- Director, Emergency Services, Central Coast
- Director, Emergency Department, Wyong Hospital
- Nursing Unit Manager, Emergency Department, Wyong Hospital
- Triage Nurse (registered nurse)
- Staff Specialist (x 2 including Senior on shift)
- House Doctor Nurse (registered nurse)
- Resident Medical Officer (x2)
- Mother of patient

#### ***Shoalhaven District Memorial Hospital***

- General Manager
- Acting Area Director, Clinical Operations
- Acting Director of Medical Services– Medical
- Acting Director of Medical Services – Administrative
- Director of Nursing
- Nurse Unit Manager, Director of Medical Services Office
- Area Patient Safety Manager
- Allied Health Manager
- Leader RCA Team & Clinical Service Director, Sydney Children’s Hospital
- Director, Emergency Department
- Visiting Medical Officer (VMO) Paediatricians (x 2)
- Locum Paediatrician
- Locum Casualty Medical Officer (CasMO)
- Acting Nurse Unit Manager, Emergency Department
- Nurse Educator, Emergency Department
- Registered nurse, Emergency Department
- Mother of patient

## 2 Summary of recommendations and areas for improvement

**Table A2.1 Shoalhaven Hospital — recommendations to address areas for improvement**

Recommendations		Areas for improvement
1	That Shoalhaven Hospital develops a process to clearly identify the senior person in charge of the emergency department in both medical and nursing teams at any particular time. Clear job descriptions indicating roles and responsibilities should be available.	<ul style="list-style-type: none"> <li>• The Shoalhaven Hospital emergency department needs better supervision and leadership</li> <li>• There is a need for administration support and involvement in clinical programs</li> </ul>
2	That the hospital's executive staff work with the newly appointed director of the emergency department in reviewing leadership roles, responsibilities and resources.	
3	That there is a joint meeting of the emergency unit medical and nursing staff at the hand over to the next shift.	<ul style="list-style-type: none"> <li>• There could be better formal communication between medical and nursing staff in the emergency department, especially at the end of shifts</li> <li>• The newly appointed director of the emergency department will need to focus on team building, communication, and resource management</li> </ul>
4	That Shoalhaven Hospital runs teambuilding exercises that focus on training clinical staff to communicate potential concerns to other members of the team especially between nursing and medical disciplines.	
5	That medical and nursing hospital administrators do a round of wards, including the emergency department, on most days. Given that the hospital is in a growth phase, and given the current reorganisation of the health system into super regional areas, it is particularly important that hospital administrators are more intimately involved at the coalface.	<ul style="list-style-type: none"> <li>• There is a need for administration support and involvement in clinical programs</li> <li>• The emergency department staff is concerned that the administration is not aware of coalface issues in the department</li> </ul>
6	That the person who is appointed to the recently funded position of director of medical education is a practising clinician.	
7	That NSW Health continues to provide resources for the hospital's administration to be involved in the dissemination, implementation and resourcing of new guidelines, including national and state guidelines and local protocols, through the Clinical Governance Unit and patient safety managers of the Area Health Service.	

Recommendations	Areas for improvement
<p>8 That Shoalhaven Hospital develops and implements a system that will provide all new doctors working in the emergency department who are new to the hospital with dedicated time for orientation. During this time the emergency medical officer positions should be covered.</p>	<ul style="list-style-type: none"> <li>• Shortcomings in orientation for new doctors, a manifestation of both teething problems and gaps in clinical leadership</li> <li>• Rapid turnover and locum coverage require improved systems for orientation and induction to the emergency department</li> </ul>
<p>9 That the four-bed paediatric unit in the emergency department is opened and resourced to create four additional paediatric beds for priority use for paediatric presentations, including short-stay observations of paediatric patients with concerning clinical signs.</p>	<ul style="list-style-type: none"> <li>• There is no specific paediatric facility to observe a sick child for a specified period of time in the emergency department.</li> <li>• There is a significant problem in accessing beds at the Shoalhaven Hospital. It is of a similar order to the major hospitals in Sydney. This affects work practices and patient care. The access problem is particularly acute during the holiday period when the local population increases by a factor of three.</li> </ul>
<p>10 That an internal working party that includes emergency department doctors and nurses and local paediatricians is created to finalise protocols, controls and policies for the use of the four-bed paediatric unit in the emergency department.</p>	<ul style="list-style-type: none"> <li>• Communication of protocols and procedures to all staff (in particular paediatric protocols)</li> <li>• Specific orientation concerning paediatric protocols and procedures</li> </ul>
<p>11 That there is adequate staff to cover both emergency department work and elective admissions, which also pass through the department.</p>	<ul style="list-style-type: none"> <li>• If all elective admissions are to be processed through the department, there needs to be adequate resourcing for this extra workload, particularly in peak seasons</li> </ul>
<p>12 That the recruitment, development and employment of clinical nurse practitioners in the emergency department is energetically advanced.</p>	
<p>13 That signage in the emergency department is in accordance with NSW Health guidelines.</p>	<ul style="list-style-type: none"> <li>• The lack of feedback following reviews — while the internal and external review processes (RCAs) have been sound, the staff at the coalface still do not know the results of them</li> </ul>
<p>14 That on arrival at the emergency department, patients are first seen and triaged by a health professional.</p>	
<p>15 That feedback on the results of internal and external reviews is done in a timely way for all staff involved in the incident under review.</p>	<ul style="list-style-type: none"> <li>• The first person a patient sees on arriving at the emergency department can be a clerical staff member rather than a health professional.</li> </ul>
<p>16 That the staff, and the family of the patient involved, be given personal feedback on the root cause analysis (RCA) and this report as soon as possible, preferably face to face.</p>	

**Table A2.2 Wyong Hospital — recommendations to address areas for improvement**

Recommendations		Areas for improvement
17	That the physical layout of the current emergency department needs to be addressed urgently.	<ul style="list-style-type: none"> <li>The layout of the current emergency department works against best practice, good communication and efficient use of resources</li> <li>The triage area is physically separated from the rest of the emergency department, posing safety and communication concerns</li> <li>There is a very limited communication system between the triage nurse and the rest of the emergency department. This means that if the triage nurse needs assistance in moving a sick patient, for example, she has to leave the desk to find support</li> </ul>
18	That clinicians remain actively involved in planning for the new Wyong Hospital emergency department.	
19	That there is a safe level of staffing in the emergency department at all times to attend to the emergency patients coming in the door.	<ul style="list-style-type: none"> <li>There are not enough medical staff to cover both the emergency department and the multitude of other related activities that the department is involved in, including obstetrics, neonatal care, and psychiatry. There is also a supervision issue arising out of the availability of senior staff.</li> <li>It is a very busy department with a relatively junior medical staff (Interns, RMOs 1 and 2)</li> </ul>
20	That there are two separate after-hours rosters, one for medical staff in the emergency department and the other for medical staff in the general hospital.	
21	That there are appropriate processes and staffing in place to cover clinical staff when they are outside the department, especially for administration duties, such as attending meetings at Gosford Hospital.	
22	That there is increased accessibility to trained Mental Health Unit staff to work with the emergency department in the initial assessment and subsequent admission of mental health patients.	<ul style="list-style-type: none"> <li>There are safety issues regarding the handling of mental health patients, particularly after 10 p.m. There is no permanent security officer in the emergency department. Waiting mental health patients are seated behind the triage nurse.</li> </ul>
23	That the additional paediatric beds in the short-stay ward are opened and the necessary nursing education in paediatric care, and paediatric support and resourcing, are provided.	<ul style="list-style-type: none"> <li>The emergency department sees 10,000 paediatric patients a year (approximately one third of all presentations to the department) but has no paediatric unit/ward, and all admissions have to be transferred to Gosford Hospital.</li> </ul>
24	That the ambulatory paediatrics service is developed, adequately resourced and staffed, at the same time that the additional paediatric beds in the short-stay ward are opened.	

Recommendations	Areas for improvement
25 That some dedicated high-dependency areas are opened and suitably staffed for observation of appropriate patients (e.g. coronary patients).	<ul style="list-style-type: none"> <li>It is a very busy department with a relatively junior medical staff (Interns, RMOs 1 and 2)</li> </ul>
26 That the emergency department is provided with greater ancillary support, noting that units in other hospitals have resources such as an aged care assessment team, nurse educators, social workers, and mental health workers.	
27 That all clinical staff wear clear visual identification of their roles.	<ul style="list-style-type: none"> <li>It is difficult to identify clinical roles because of the similarities in uniforms</li> <li>The transient workforce means that in many instances, it is not possible to establish easy relationships between clinical staff</li> </ul>
28 That the staff, and the family of the patient involved, be given feedback on the chart and patient review, and this report, as soon as possible.	<ul style="list-style-type: none"> <li>Critical incident debriefing and support was strong for the medical staff after the incident in question — it was mostly informal and provided by friends and colleagues. While the nursing unit manager looked after the nursing staff, greater involvement of the nursing administration is needed (for example, the needs of the day staff were addressed but the night staff can and did miss out).</li> </ul>
29 That the root cause analysis (RCA) route could provide greater transparency and clarity of process in the review of fatal cases of meningococcal disease in young people.	<ul style="list-style-type: none"> <li>In retrospect, this particular case could have been coded as a SAC I event.</li> <li>While the chart and patient review were adequate, it would have provided greater transparency and clarity of process if the RCA route had been adopted</li> </ul>

**Table A2.3 General recommendations**

30	That statewide guidelines be developed to offer children opportunistic vaccination at the site of clinical contact, particularly at institutions where the emergency department fills the role of the primary carer for a significant proportion of the population.
31	That given the high degree of mobility of health care workers, especially medical staff within tertiary and secondment hospitals, emergency department policies and procedures be standardised throughout NSW using best practice guidelines wherever possible.
32	That NSW Health continues to provide resources for clinical governance units to ensure the dissemination and implementation of new clinical guidelines.
33	That the education package and processes about meningococcal disease developed by Dr Duncan Reed of the Gosford and Wyong emergency departments are disseminated for use in NSW.
34	That the staff involved in adverse events and critical incidents, together with the families of those patients involved, be given feedback on the root cause analysis (RCA) and other reports as soon as practicable. This should be done personally and in a sympathetic environment.
35	That meningococcal deaths in young people should be considered severity assessment code one (SAC 1) events under most circumstances, and hence should be the subject of a root cause analysis.
36	That all patients leaving an emergency department either for transfer to a ward or home should have formal documentation of observations immediately prior to transfer and a formal note documented that the patient is fit for transfer or discharge.
37	That hospitals develop processes to identify the senior person in charge in the emergency department, their roles and responsibilities, in medical, nursing and allied health areas.
38	That to ensure adequate handover between shifts there is an efficient and effective system in place involving both nursing and medical staff.
39	That medical and nursing administrators develop a practice of regular ward rounds. Ideally, this should be part of their daily activity to enable them to interact with clinicians at the coalface.
40	That medical officers who are new to an emergency department are given sufficient dedicated time for orientation and induction, and provided with appropriate protocols. This will require some degree of 'backfill' during the time needed for orientation.
41	That NSW Health works with clinicians to re-assess the time at which rotations and secondments change.

**Table A2.3 — continued**

42	That there is a safe level of staffing in emergency departments at all times to attend to the expected emergency workload. This may require attention to rostering practices at peak periods, for example, during holiday seasons.
43	That the recruitment, development and employment of clinical nurse practitioners in emergency departments is energetically advanced.
44	That on arrival at the emergency department, patients are first seen and triaged by a health professional.
45	That signage in emergency departments is in accordance with NSW Department of Health guidelines.
46	That given the high degree of mobility among health care workers, all clinical staff in emergency departments are clearly identified and wear uniforms clearly stating their role.

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## **ABBREVIATIONS**

JMO	junior medical officers
NAT	nucleic acid testing
NSCCH	Northern Sydney Central Coast Health
NT	Northern Territory
RCA	root cause analysis
RMO	resident medical officer
SAC	severity assessment code
SESAHS	South Eastern Sydney and Illawarra Area Health Service
VMO	visiting medical officer