From the President's Office
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19 April 2021

Portfolio Committee No 2
Parliament of New South Wales
Macquarie Street, Sydney NSW 2000

Via email: PortfolioCommittee2@parliament.nsw.gov.au

Re: Inquiry into Health Outcomes and Access to Health and Hospital Service in Rural, Regional and Remote NSW Response to Supplementary Questions

On behalf of Dr Shehnarz Salindera, Councillor, Australian Medical Association:

1. Can you please provide a copy of the two most recent AMA surveys into safe hours?

The AMA conducted a Safe Hours Audit in 2016 and 2011 (Appendix 1A and Appendix 1B). In addition, the AMA developed a voluntary National Code of Practice – Hours of Work, Shiftwork and Rostering for Hospital Doctors. (Appendix 1C).

2. What is your response to telehealth? Please provide the AMA position statement.
The AMA has long advocated for telehealth consultations to be subsidised under the Medicare Benefits Schedule (MBS). Telehealth will not replace face to face care, but it does support better access to care for patients, including by supplementing face to face care or by supporting patients who face barriers to care, such as those in rural areas.
The AMA's Position Statement on Better access to high-speed broadband for rural and remote healthcare (2016) recognises that technology-based patient consultations and other telehealth initiatives can improve access to care and can enhance efficiency in medical practice.
This position statement outlines the importance of better access to high-speed broadband for medical practices, other healthcare providers and institutions, and patients, to improve regional, rural and remote health care in Australia, and highlights key solutions for achieving this. (Appendix 2A)

3a. In addition to what is contained in your submission and evidence provided at the public hearing, do you have any further comments regarding the current provision of palliative medicine, nursing and care in rural, regional and remote New South Wales?

3b. In addition to what is contained in your submission and evidence provided at the public hearing, do you have any further comments regarding ways to improve both the access and availability of palliative medicine, nursing and care in rural, regional and remote New South Wales?

Response to Question 3a:

The AMA(NSW) sought input from our Hospital Practice Committee to prepare a response to the Inquiry's questions regarding palliative care. We received valuable input from a palliation specialist currently working in regional setting, and who has been had both the clinical and administrative roles within the NSW Health system over many years.

Critically, it was indicated that there needs to be an understanding of the difference between "palliative care" generally, and a "specialist palliative care service" and the need for rural, regional and remote communities to be able to need access both.

Most broadly, 'palliative care' is the ability to treat suffering and remediate symptoms in a broad bio-psycho-social disease model; in the setting of incurable, life-limiting disease – in this regard, all doctors and nurses should the capability to provide good 'palliative care' and should be able to identify incurable, progressive disease; and ensure that appropriate treatment of suffering is provided to the patient (and to their family).

Specialist palliative care is required when the symptoms, suffering or situation contains complexity which is beyond the scope of an 'generalist' clinician.

The palliative care model in rural settings, is delivered much like the provision of emergency care, whereby there are many smaller facilities staffed with general practitioners and nurses who are skilled in identifying and managing conditions, and will refer to a specialist, usually at a base hospital or metropolitan centre for input for complex cases.

The AMA(NSW) understands that rural communities have an expectation that most general practitioners and nurses working in rural facilities will have some familiarity and skills in emergency management and will require access to emergency specialists for 'complex emergencies'. This brings into play he need for networking and retrieval services. Similarly, GPs and nurses in these facilities should be competent and comfortable to manage 'general palliation', in the same way as the community have expectations around a certain capacity to manage acute 'emergency' presentation and just as will emergencies, access to higher-level networked specialist palliative care services across the state to support local communities and providers is required.

However, palliative care is markedly different to emergency care because is not just an acute physiological presentation for management, stabilisation and retrieval, it is more than likely a case each patient has to be managed over varying time frames, (days – weeks – months), and cared for locally.

The presenting issues are 'bio-psychosocial' and, understandably, often spiritual concerns arise from the experience of a human being, coming into their dying time. While specialist care and direction may be provided over video conferencing ('VC') in many emergency cases, palliative care patients can be difficult engage with in this manner due to the individual human experience of each dying person.

The AMA(NSW) appreciates that it may not be realistic or financially feasible to locate specialist services (palliative and other specialties) in every community. However, the type of service that has worked well for rural emergency medicine across the state (remote VC consulting, supported by extraction from community to a networked hierarchy of specialist centres) will not, and does not work in palliative care; patients wish to remain close to home, familiar people, and their community. In palliative care, the medicine needs to be available at the location of the individual.

The AMA(NSW) understands that currently, most specialist palliative care services in regional areas are 'nurse led'; a delivery of service that can be effective provided it is implemented well and adequate medical support is available. It is also noted that there is an urgent need for enhancement of allied health positions in regional specialist palliative care services, as most services have minimal / patchy covering of allied health staff.

Palliative Care Australia published a guideline for Palliative care service development in 2018 https://palliativecare.org.au/wp-content/uploads/dlm_uploads/2018/02/PalliativeCare-Service-Delivery-2018_web-1.pdf which contains (Appx 1, pp 33 – 34) guidelines for a medical, nursing and allied health workforce profile, which is supported by the AMA(NSW).

Response to Question 3b:
AMA(NSW) believes the communities of rural, remote and regional NSW would benefit a state-wide (or series of LHD-wide) networked services, which are sufficiently robust to provide the needed support to local providers (noting that some of which may need to be provided via VC); and to supported by sufficient resources present on the ground in the communities they serve – whilst perhaps not permanently in all cases, but frequently enough that the specialist staff are seen as being part of a shared human experience for those people. This is particularly important for aboriginal people, their communities, and families.

The AMA(NSW) is concerned about the risk of providing specialist palliative care services providing outreach by "VC / telehealth" models. The communities of NSW require people who can physically come into communities and meet with patient in their own environments.

To improve the delivery of palliative care across rural, remote and regional NSW, the AMA(NSW) offer the following.

1. **a concerted effort to stop the fragmentation of services by 'project funding' a variety of private service providers, at the expense of enhancements in the public sector**

In NSW currently there are multiple, independent, privately run bereavement services operating across the state. Feedback we have received, is that, in practice, with these services have little to with each other and provide little engagement with the public sector.

It is understood the NSW Health project fund such services, and we are of the view it would be far more beneficial for communities if NSW Health were to invest funding into expanding and developing bereavement services available through local health districts and their existing specialist palliative care services, rather than providing additional short-term funding to other small, private agencies to do bereavement work.

2. **Enhancement of the public sector (NSW Health) palliative care sector must occur**

In 2015, NSW Ministry of Health published the ACI Palliative Care Blueprint document. https://aci.health.nsw.gov.au/palliative-care-blueprint . The AMA(NSW) is supportive of the Blueprint, however, is not aware of the implementation of the Blueprint or whether any engagement from LHDs has occurred.

The AMA(NSW) suggests the Ministry requires LHDs to formally provide a 'gap analyses' of services on the ground against the Blueprint document and use this as a platform for transparent, structured service planning and delivery of enhancements across the state. Service enhancements should be delivered on the basis of an LHD being able to demonstrate a structured, strategic approach to the utilization of enhancements in line with their planned response to the Blueprint document.

3. **Remuneration of rural GPs**

In recent years, the AMA(NSW) is aware that GPs are encouraged to ensure that all patients being managed with palliative intent have an Advance Care Directive ('ACD'), using the Ministry document https://www.health.nsw.gov.au/patients/acp/Publications/acd-form-info-book.pdf

While ACD publication does assist structuring and discussing end of life is not a simple conversation, and it takes significant time to work through in a compassionate, empathic and effective way and "end of life planning" can involve a number of conversations with a patients and family members.

The feedback AMA(NSW) has received is that current remuneration does not allow GPs to effectively engage in simple palliative care – because "simple" refers to the medical symptom control, not the complexities of helping another human being consider the ending of their days, and how they will approach their dying.

It is also important to note end of life planning can require the assistance of psychologists and counsellors. In many rural communities these services are lacking or non-existent and this leaves the rural GP is left to do all that work because: 1) the community expect it of them and 2) there is no-one else to whom the work can reasonably be referred.

The Ministry needs to consider the remuneration packages available to GPs to engage in this work: adjusting those that the Ministry has control over to reasonably reflect the complexity and time-commitment of the work; and lobbying the Federal Government/Medicare to do likewise.

4. **Training opportunities in regional areas for developing palliative care skills**

The AMA(NSW) reiterates its position contained in its substance submission with respect to increasing training programs via the Colleges and extends that to include colleges providing training in the palliation space (ACRRM, RACGP, RACP). Without increasing training opportunities for registrars / rural GPs in palliative care in rural settings a permanent regional service will not be developed or sustained.

The RACP particularly needs to consider the expansion of specialist rural training positions in palliative care in regional NSW.

It is evident from simple a search on the RACP website which lists current accredited training posts in NSW for both full Fellowship (FAChPM) and for the Clinical Diploma https://www.racp.edu.au/docs/default-source/trainees/accredited-settings/at-palliative-medicine-accredited-sites.pdf?sfvrsn=b2d3021a_28

This shows that outside of the major centres (Sydney, Newcastle, Wollongong), there are three (3) positions accredited for some training toward fellowship, and another six (6) sites (making nine in total) with accreditation for training a diploma candidate. If completely staffed with diploma candidates (at the expense of fellowship trainees), the rural sites would be able to train 12 diploma candidates concurrently.

The clinical diploma is currently the only recognised qualification for GPs to obtain (without obtaining a full 3-year fellowship by training at an urban centre). The current accredited training capacity for the diploma is insufficient to keep pace with attrition of experienced rural GPs across the state and will be unable to accommodate the training and upskilling of the rural GP workforce in palliative medicine that will be required in the next 5 years.

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The AMA(NSW) is of the view this training could be provided using existing agencies. By way of example, we are aware HETI invested significant energy in developing a two-day weekend workshop in palliative care for rural GPs an rural generalist registrars. This workshop ran successfully in Coffs Harbour twice (to a total of between 80 and 90 GPs). The workshop had originally been envisioned as the first of two workshops in palliative care for GPs, with an 'introductory workshop' and an 'advanced workshop' to follow. We understand the workshop received positive feedback from the candidates who attended. The palliative care doctors involved in establishing the workshop were happy to continue it as an annual event, moving locations around the state to increase exposure; and had expressed a willingness to begin work on the curriculum for the advanced workshop, but the workshop was suspended in 2019 by HETI to focus on other training avenues and projects. The AMA(NSW) would encourage HETI to re-establish the program.

5. Specialist workforce

As set out in the AMA(NSW)'s substantive submission, our view remains that Ministry needs to look at the location of future specialist palliative care medical and nursing appointments with existing appointments, to develop local critical mass and make overall recruitment and retention more successful.

Currently, recruitment of specialist palliative care physicians in the rural sector occurs in direct competition with expanding urban services. Urban services often operate with an existing critical mass of 3 – 4 staff specialists with training registrar support. It is practically impossible to create an 'attractive' position in a rural centre where the LHD may be recruiting for a single (solo-practice) palliative care specialist, with significantly limited access to specialist palliative care nurses and allied health staff to complement and round-out the palliative care service multi-disciplinary team.

Once a workforce is established, a feasible plan for networked service provision / enhancement within each LHD must be developed. The concentrated appointments should be to increase a local workforce including co-located staff specialists and registrar appointments to facilitate training. A plan for the provision of networked outreach care within an LHD should be established and thereafter continuing this process until each of the rural LHDs have a clearly established internal network of specialist palliative care services, with a sustainable critical mass of medical specialists.

Yours Sincerely,

Dr Danielle McMullen
President, AMA (NSW)

**Managing the Risks of Fatigue
in the Medical Workforce**

2016 AMA Safe Hours Audit

**Managing the Risks of Fatigue in
the Medical Workforce**

2016 AMA Safe Hours Audit

The Australian Medical Association
15 July 2017

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2016 AMA SAFE HOURS AUDIT BY NUMBERS

The **good news** is that fewer doctors are working shifts and rosters that put them at risk of fatigue than there were 15 years ago. The **bad news** is that extremes in working hours still persist and many hospital doctors continue to work rosters that place them at higher risk of fatigue.
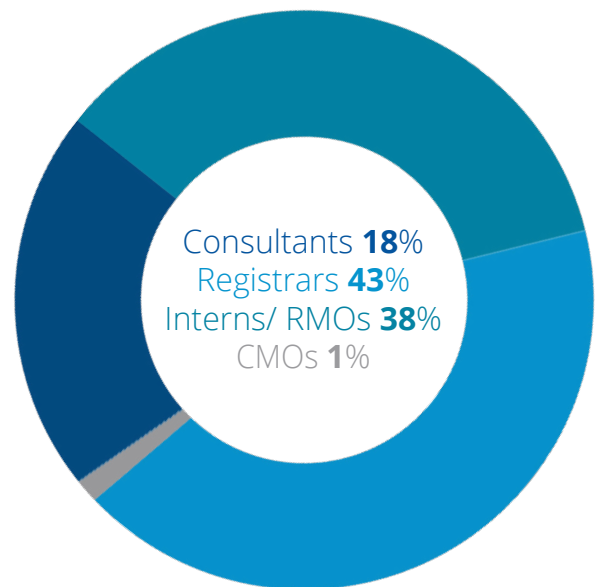
1 IN 2 DOCTORS ARE WORKING UNSAFE HOURS

53%

One in two doctors are working hours that put them at significant or higher risk of fatigue.

RESPONDENTS BY RISK OF FATIGUE

Higher risk **10%**
Significant risk **43%**
Lower risk **47%**
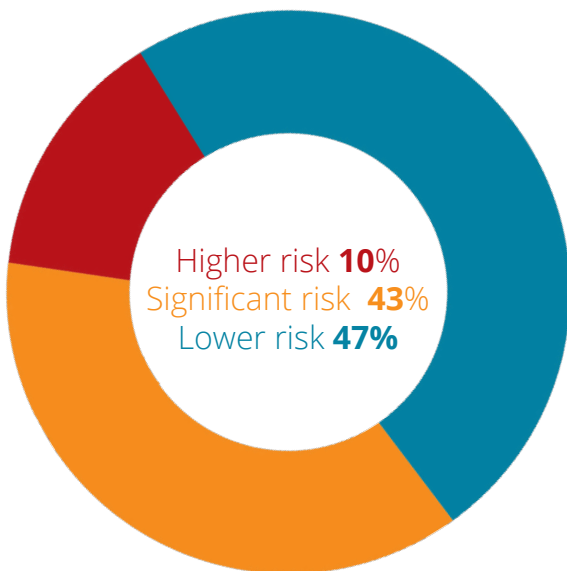
4 OUT OF 5 RESPONDENTS WERE DOCTORS IN TRAINING

Consultants **18%**
Registrars **43%**
Interns/ RMOs **38%**
CMOs **1%**

THE PROFILE OF DOCTORS AT HIGH RISK OF FATIGUE

118 hours
Longest total hours worked in a week

78 hours
Average hours worked in a week

76 hours
Longest hours worked in a shift

18 hours
Average hours worked in a shift

11%
had two full days free of work

41%
were on call for three or more days

46%
worked three or more days without a meal break

WHO IS AT RISK OF FATIGUE?

Intensive Care	**75**%	
Surgery	**73**%	
Obstetrics & Gynaecology	**58**%	
Medicine/ Physician	**54**%	
Emergency Medicine	**38**%	
Psychiatry	**34**%	
Anaesthesia	**31**%	
General Practice	**22**%	
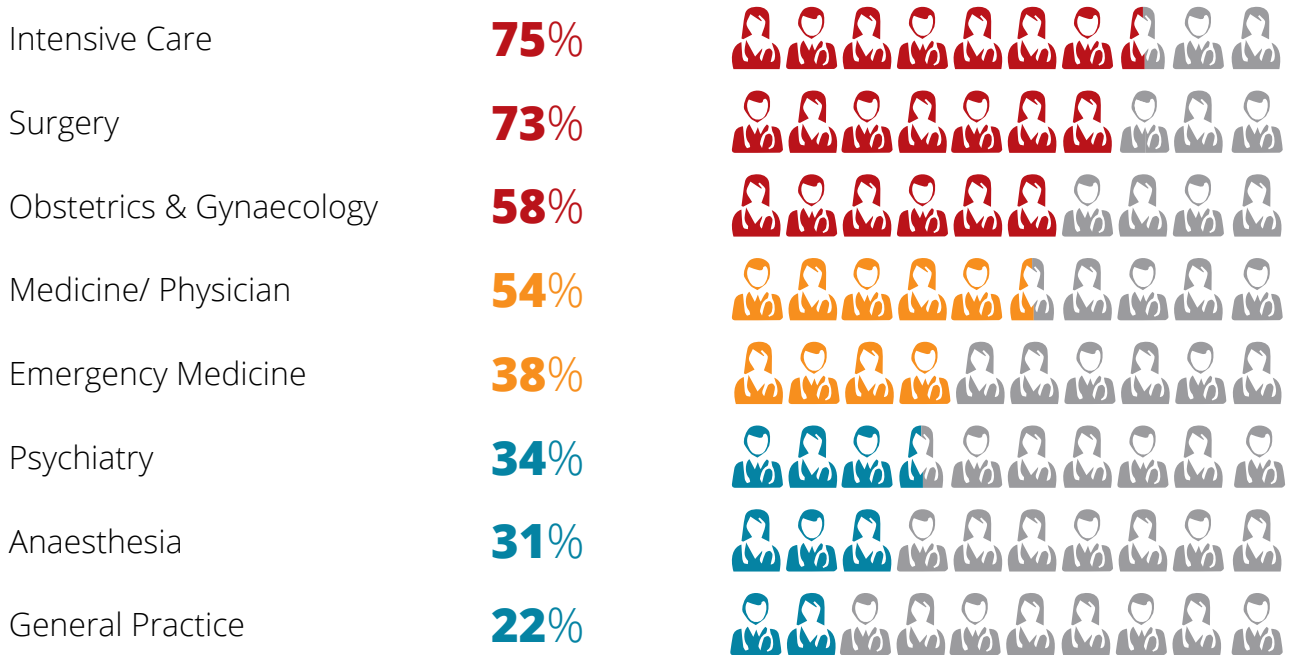
REGISTRARS ARE MORE LIKELY TO BE WORKING RISKY HOURS

	Lower risk of fatigue	Significant risk of fatigue	Higher of fatigue
CMOs/ Consultants	53%	38%	9%
Registrars	41%	48%	11%
Interns/ RMOs	51%	39%	10%

■ Lower risk of fatigue   ■ Significant risk of fatigue   ■ Higher of fatigue
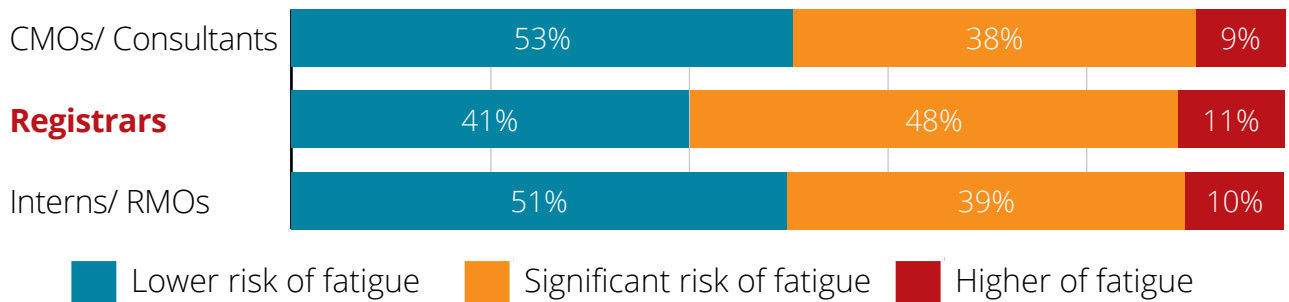
WHAT HAS CHANGED SINCE 2001?

↑**114**% increase in the number of doctors working hours that place them at **lower risk of fatigue**

↓**21**% decrease in the number of doctors working hours that place them at **significant risk of fatigue**

↓**57**% decrease in the number of doctors working hours that place them at **higher risk of fatigue**
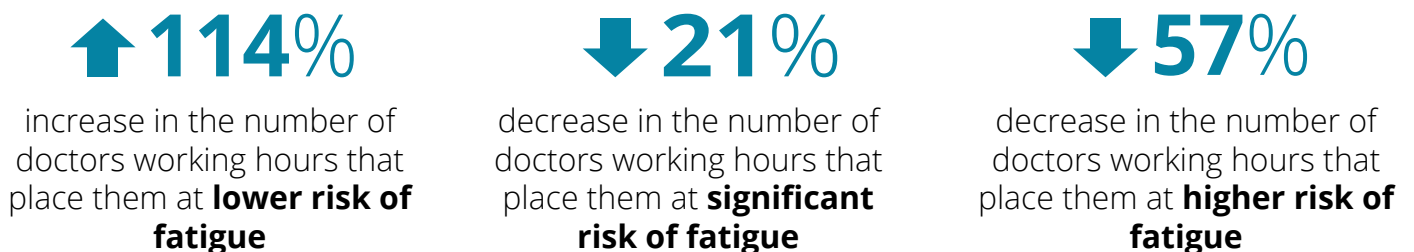
UPDATED 2016
AMA NATIONAL CODE OF PRACTICE HOURS OF WORK, SHIFTWORK AND ROSTERING FOR HOSPITAL DOCTORS

A practical guide to managing fatigue and reducing the risks associated with shiftwork and extended working hours.
https://ama.com.au/article/national-code-practice-hours-work-shiftwork-and-rostering-hospital-doctors

Read the 2016 AMA Safe Hours Audit Report at https://ama.com.au/article/2016-ama-safe-hours-audit

Executive Summary

Background

The AMA has conducted Safe Hours Audits of hospital-based doctors every five years since 2001. The 2016 Audit is the fourth nationwide AMA survey of doctors' working hours to assess the fatigue risks of their current working arrangements. The report of the 2016 AMA Safe Hours Audit provides contemporary insights into the working patterns and risk of fatigue for hospital-based doctors.

An online tool was used to collect data on the hours of work, on-call hours, non-work hours, and the sleep time of doctors during the audit week from 31 October to 6 November 2016. Participants were then categorised into three different risk levels – lower, significant, and higher – to determine their risk of fatigue, based on factors such as total weekly hours, the amount of night work, the length of shifts, the extent of on-call commitments, access to breaks, and the long-term work patterns.

General Trends – Hospital-based doctors

2001 – 2016

–   In 2001, 78 per cent of doctors were working rosters that placed them at significant and higher risk of fatigue. In 2016, this figure has dropped to 53 per cent.

–   Since 2001, there has been an increase in the number of doctors working in the lower risk of fatigue category (22 per cent in 2001 compared to 47 per cent in 2016) and a decrease in the number of doctors working in the significant (54 per cent in 2001 compared to 43 per cent in 2016) and higher risk (24 per cent in 2001 compared to 10 per cent in 2016) category of fatigue. This trend is evident across all classifications and disciplines.

–   There has been little change in the range and total average of hours worked by doctors in each category since 2001. However doctors in the higher risk category are working longer shifts than they were 15 years ago (18 hours in 2016 compared to 16 hours in 2001).

–   While there has been an increase in the number of doctors across all categories being able to access two or more full days free of work from 2001 to 2016, there has been a rise in the number of doctors in the higher risk category who work three or more consecutive days on call (31 per cent in 2001 compared to 41 per cent in 2016).

2011 – 2016

–   In 2016, one in two doctors (53 per cent) continued to work rosters that put them at significant and higher risk of fatigue. This number has not changed since 2011.

Risk by classification

–   There was an 11 per cent increase in the number of Interns/RMOs working in the higher risk category since 2011.

–   While the number of Registrars whose working patterns place them at higher risk of fatigue has decreased since 2011, 59 per cent are still working shifts that place them at significant and higher risk of fatigue, higher than the percentage of Intern/RMOs (49 per cent) and CMO/Consultants (47 per cent).

Risk by discipline

–   In 2016, 75 per cent of Intensivists, 73 per cent of Surgeons, 58 per cent of Obstetricians and Gynaecologists and 54 per cent of Physicians continued to work shifts and rosters that placed them in the significant/higher risk categories.

–   While the general trend has seen fewer doctors in each discipline working rosters that expose them to higher risks of fatigue, the number of Obstetricians and Gynaecologists working in the higher risk category has almost doubled since 2011 (an increase of 98 per cent).

Working hours

–   In 2016, the longest recorded shift for doctors in the higher risk group increased to 76 hours. This is almost double the longest shift recorded in 2011 of 43 hours.

–   The number of work free days has increased across all risk categories since 2011. However only 11 per cent of doctors in the highest fatigue risk category reported they had two or more full days free of work during the audit period.

–   The number of doctors working three or more days on call has decreased across all risk categories since 2011. In 2016, 41 per cent of doctors in the highest fatigue risk category reported they worked three or more days on call during the audit period compared to 49 per cent in 2011.

–   While the number of doctors skipping meal breaks has decreased since 2011, 46 per cent of doctors in the higher risk category, 35 per cent of doctors in the significant risk category, and 20 per cent of doctors in the lower risk category reported to skip a meal break on three or more occasions in 2016.

1. Introduction

Over the last decade, the AMA has undertaken significant work to address the risks of fatigue for doctors, including the development of the AMA National Code of Practice on Hours of Work, Shiftwork and Rostering for Hospital Doctors. The AMA Federal Council adopted this code in 1999.

In 2001 the AMA conducted its first Safe Hours Audit of hospital-based doctors in training. This was followed by a second Safe Hours Audit in 2006 that was extended to cover salaried doctors. In 2011, the Audit was broadened to include general practitioners.

The 2016 AMA Safe Hours Audit is the fourth nationwide survey of hospital-based doctors' working hours conducted by the AMA to assess the fatigue risks of their current working arrangements. It provides insights into the working patterns and fatigue risks for hospital-based doctors for the period during which the survey was conducted. It also provides an additional data set to compare the results of the past three audits, and allows a longitudinal comparison of any changes in working patterns and risk of fatigue over that time.

2. Methodology

The 2016 Safe Hours Audit was conducted from 31 October to 6 November 2016 using an online tool that collected data on the hours of work, on-call hours, non-work hours, and sleep time of doctors in training (DiTs) and salaried doctors during the seven day audit period. An invitation to complete the survey was forwarded to doctors by e-mail, and AMA members and non-members were able to participate. Details of the audit were also published in Australian Medicine, State AMA publications, and the social media platforms, Twitter and Facebook.

Data was analysed against an established risk assessment model developed by the AMA in 2000. This model considered factors such as total weekly hours, the quantity of night work, the length of shifts, the extent of on-call commitments, access to breaks, and the long-term work pattern. Using a validated scoring system, the model categorised doctors into three different risk levels: lower, significant, and higher risk.

Risk assessment model

The model's scoring system is based on a simple points calculation. Twenty (20) points are added or subtracted for shifts that exceed 14 hours per day, where no work breaks are taken during shifts, for on-call commitments, where the doctor has no full day off in a week, and where the break between shifts is less than 10 hours. Points are weighted for hours worked at night because of the association with greater fatigue. They are also allocated on the basis of work schedules in the previous and forthcoming week.

While the AMA risk assessment audit methodology does not provide a precise measurement of fatigue and performance impairment, it is an indicator of the level of risk associated with specific work schedules.

3. Respondent profile

The audit had 716 valid responses. The majority (675) of these were from hospital-based doctors and form the basis of this report.[1] Of these, 38 per cent were Interns/Resident Medical Officers (RMOs), 43 per cent were Registrars, 1 per cent were Career Medical Officers (CMOs), and 18 per cent were Consultants. Thirty per cent of respondents were Physicians.

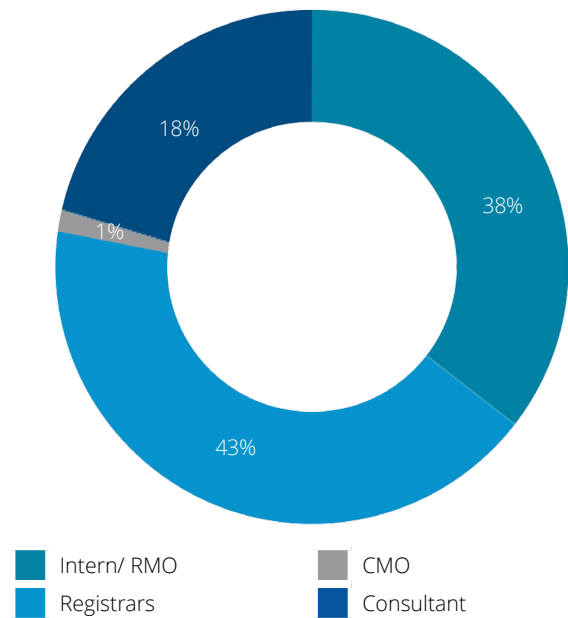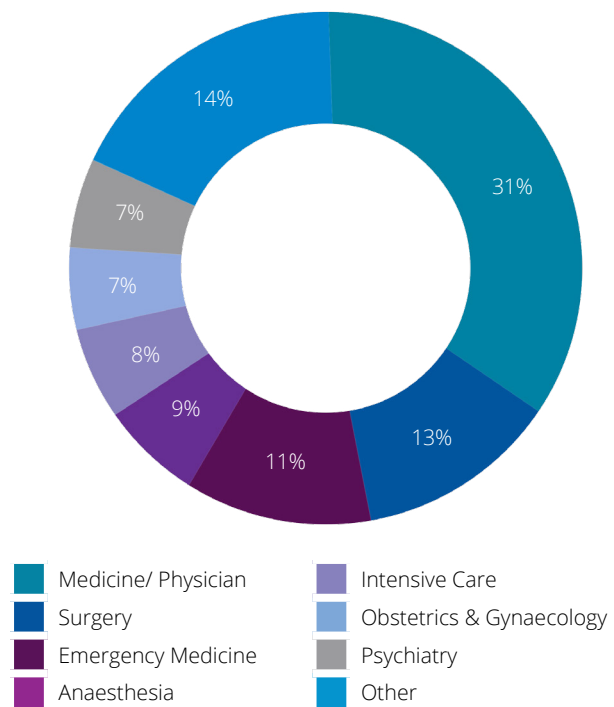**FIGURE 1** Respondents by classification (2016)

- Intern/ RMO
- Registrars
- CMO
- Consultant

FIGURE 2 Respondents by clinical discipline (2016)

- Medicine/ Physician
- Surgery
- Emergency Medicine
- Anaesthesia
- Intensive Care
- Obstetrics & Gynaecology
- Psychiatry
- Other

[1] A total of 37 General Practitioners (GPs)/GP registrars responded to the survey. There is a simple analysis of their risk profile at the end of this report. The AMA acknowledges that many GPs are working in hospitals on a part time or other basis. In this regard, GPs are acknowledged as being critical to the provision of hospital services in rural and remote areas.

4. Risk by classification

There has been a general increase in the number of doctors working in the lower risk categories and a corresponding decrease in the number of doctors working in the higher risk categories since 2011, with the exception of Interns/RMOs (Figure 3). Furthermore, Figure 4 shows there has been a marked improvement in the proportion of doctors in the significant and higher risk categories since the first audit was conducted in 2001.

However, 53 per cent of all doctors in 2016 continue to work rosters that place them in the significant and higher risk categories; this has not changed since 2011. Registrars appear to be at particular risk with 59 per cent working rosters that place them at significant and higher risk of fatigue compared to 49 per cent of Interns/RMOs and 47 per cent of CMO/Consultants.

The number of Interns/RMOs working in the higher risk category increased by 11 per cent in 2016 compared with the 2011 report. This was accompanied by a 9 per cent decrease in numbers working in the significant risk category.

FIGURE 3 Respondents by classification and risk category (2016)
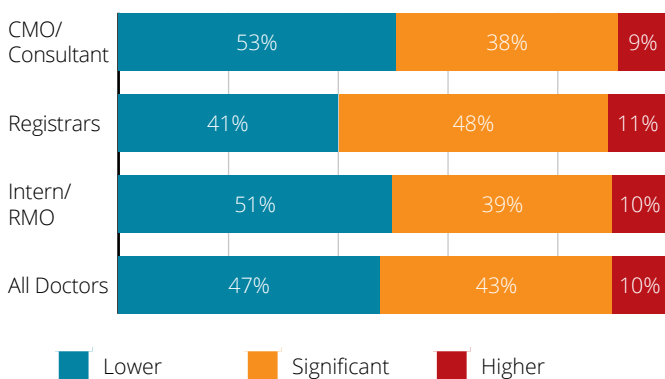
FIGURE 4 Trends in risk category 2001 – 2016
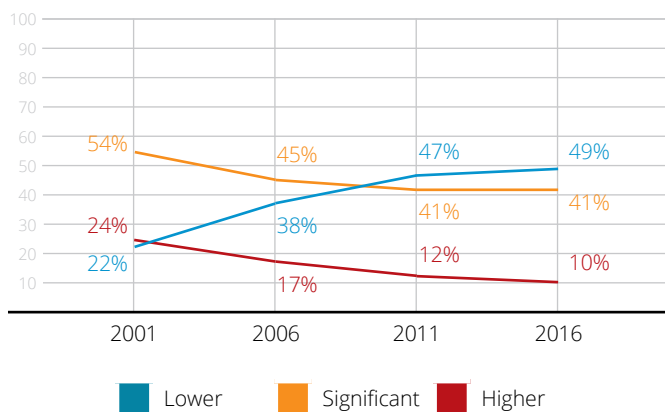
5. Risk by discipline

There was significant variation in risk categories within and between different clinical disciplines (Figure 5).

FIGURE 5 Clinical discipline by risk category – seven day audit period (2016)
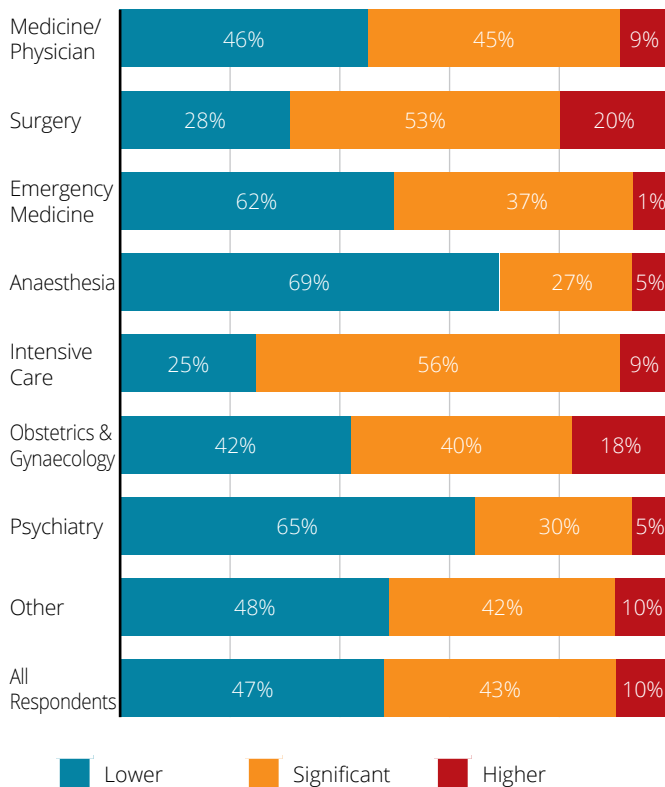

Table 1 suggests that the risk profile of most disciplines has continued to improve since the 2011 audit. Surgery, Emergency Medicine and Anaesthetics have achieved further improvement in their risk profile, with greater numbers in the lower risk category and/or fewer number in the higher risk category. However three out of four Surgeons (73 per cent) and Intensivists (75 per cent) reported to work rosters that place them at significant and higher risk of fatigue, significantly more than the 53 per cent reported by all doctors.

With the exception of Obstetrics and Gynaecology and Anaesthetics, all medical disciplines saw a reduction in numbers in the higher risk category. For Anaesthetics, the number of doctors working in the higher risk category increased marginally from 4 per cent to 5 per cent from 2011. However, Obstetrics and Gynaecology recorded a substantial increase in the number of doctors working in significant (40 per cent compared in 2016 to 17 per cent in 2011) and higher risk categories (18 per cent compared in 2016 to 9 per cent in 2011). This corresponded with a decrease in number in the lower risk category (42 percent in 2016 compared to 74 per cent in 2011).

The shift in risk profile for Obstetrics and Gynaecology warrants further evaluation, noting that doctors can still work significant hours provided appropriate arrangements are in place to manage the risk of fatigue.

TABLE 1 Clinical discipline by risk category 2016 – 2011

	Lower		Significant		Highest	
	2016	2011	2016	2011	2016	2011
Medicine/ Physician	46%	46%	45%	45%	9%	9%
Surgery	28%	23%	53%	51%	20%	26%
Emergency Medicine	62%	66%	37%	27%	1%	6%
Anaesthetics	69%	62%	27%	34%	5%	4%
Intensive Care	25%	NA	56%	NA	19%	NA
Obstetrics & Gynaecology	42%	74%	40%	17%	18%	9%
Psychiatry	65%	NA	30%	NA	4%	NA
Other	48%	52%	42%	35%	10%	13%
All respondents	47%	47%	43%	41%	10%	12%

6. Working hours

There was significant overlap in the range of total hours worked between the lower, significant, and higher risk groups (Table 2). This illustrates the point that other variables, along with the total number of hours worked in a week, influence the final risk rating of the work schedule. These include whether the work was performed in the day or at night, the frequency of on-call commitments, opportunities for rest breaks, and the other variables identified in the risk assessment guide of the Code as contributing to the risk associated with specific rostering practices.

There has been a slight reduction in the average hours worked by doctors in lower and significant risk categories since 2011. The higher risk category remains unchanged since 2011 (Figure 6). The average total hours worked by doctors in 2016 was 52.5 hours per week, down from 55.1 hours in 2011.
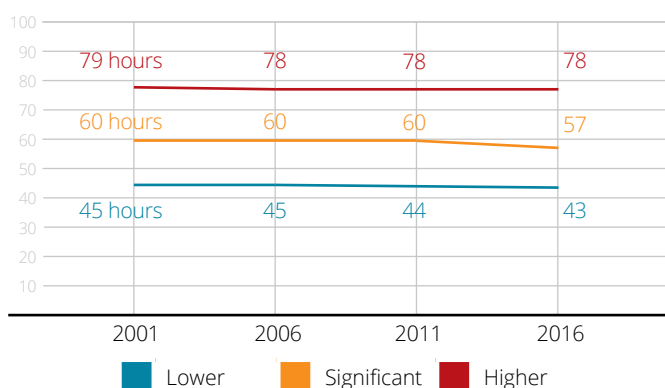
Table 3 indicates that the longest recorded continuous period of work has increased for all doctors. This increase is particularly marked for doctors in the higher risk group where the longest recorded continuous period of work was 76 hours in 2016, significantly longer than the 43 hours recorded in 2011, and exceeds the longest shift recorded in the 2001 audit of 63 hours.

The audit found that the average shift length for doctors working in the lower and significant risk categories was similar to the average length recorded in 2011. The average shift length for doctors in the higher risk category has increased by two hours to 18 hours in 2016, compared to 16 hours in 2011.

TABLE 3 Longest continuous period of work by risk category – seven day audit period (2016)

Risk Category	Range (hours)		Average hours	
	2016	2011	2016	2011
Lower	37	19	12	12
Significant	59	34	14	14
Higher	76	43	18	16

TABLE 2 Average total hours worked by risk category (2016)

Risk Category	Range (hours)	Average hours	
	2016	2016	2011
Lower	1 – 60	43	44
Significant	5 – 88	57	60
Higher	42 – 118	78	78

FIGURE 6 Range of total hours worked by risk category 2001–2016

FIGURE 7 Longest continuous period of work by risk category 2001 – 2016
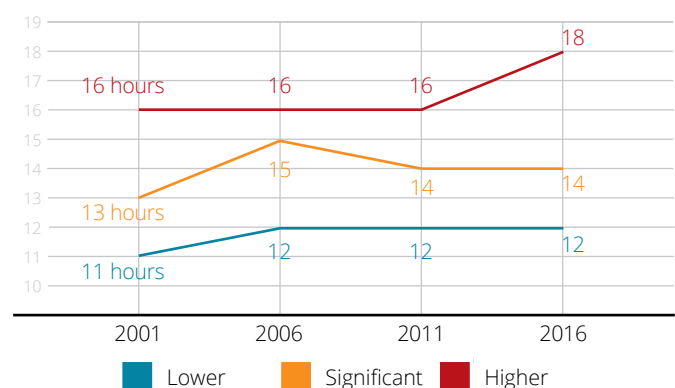
7. Other indicators

The results of the 2016 audit indicate that 86 per cent of doctors in the lower risk and 43 per cent of doctors in the significant risk category have two or more days free of work. This compares to only 11 per cent of doctors in the higher risk category (Figure 8).

FIGURE 8 Two or more full days free of work by risk category 2001 – 2016
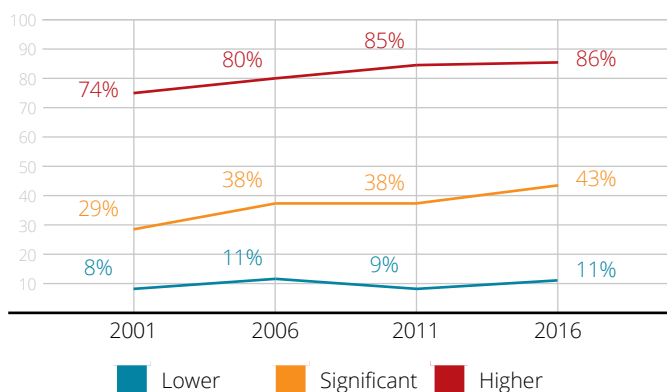
Considerably more doctors in the significant risk category had no work free days during the seven day audit period – this has decreased only slightly from the 2011 audit results (70 per cent in 2016 versus 72 per cent in 2011).

Figure 9 indicates that fewer doctors in the higher risk category are working rosters where they have three or more days on-call (41 per cent in 2016 down from 49 per cent in 2011); this has been coupled by an increase in the number of days with no on-call commitments (47 per cent in 2016 against 32 per cent in 2011). By contrast, the number of doctors working three or more days on-call in the significant risk category did not change; the number of doctors in the lower risk category decreased slightly.

FIGURE 9 Three or more days on-call by risk category 2001 – 2016
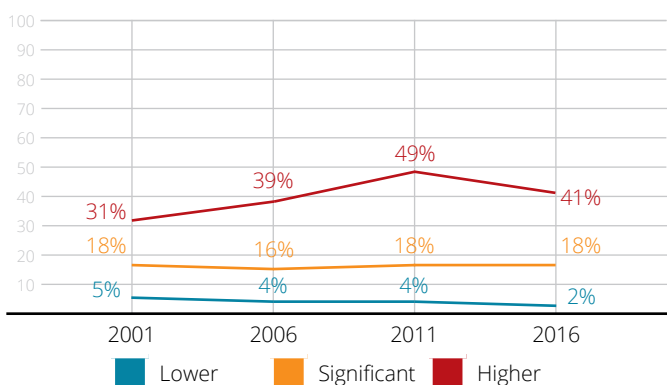
While the number of doctors skipping meal breaks has decreased since 2011, 46 per cent of doctors in the higher risk category, 35 per cent of doctors in the significant risk category, and 20 per cent of doctors in the lower risk category reported to skip a meal break on three or more occasions in 2016 (Figure 10).

FIGURE 10 Days without a meal break by risk category – seven day audit period (2016)
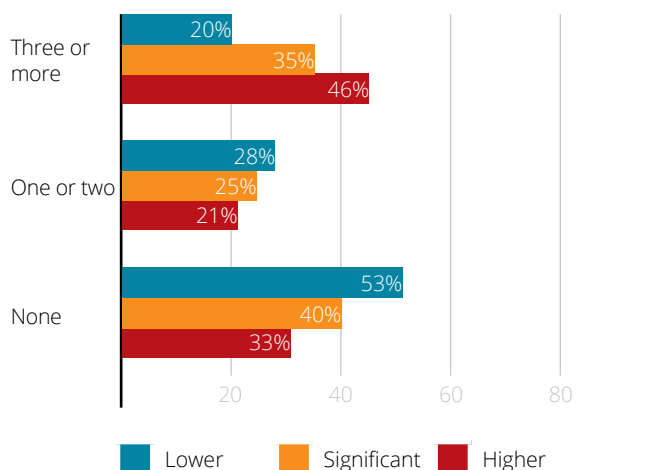

8. General Practice

The AMA recognises that the risks of fatigue are not just an issue for doctors working in the hospital sector, but for General Practice also.

The risk profile of General Practice has continued to improve since the 2011 audit. In 2016, 78 per cent of General Practitioners (GPs) who responded worked hours that placed them in the lower risk category, compared to 35 per cent in 2011 (Figure 12).

FIGURE 12 Risk profile of General Practice 2016
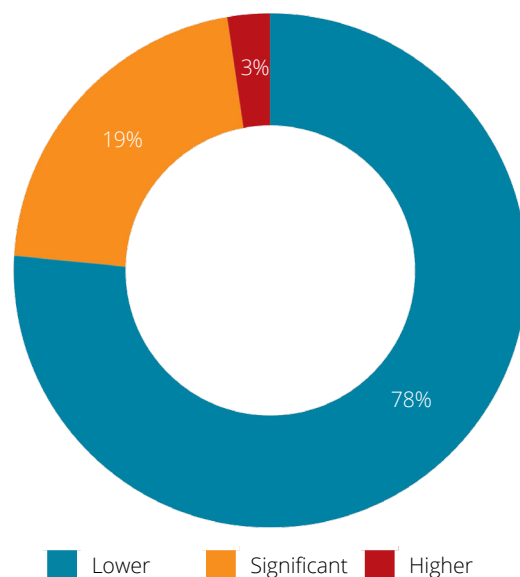
Only 37 GPs/GP registrars participated in the Audit, which means the results should be treated with caution. However, it would appear that the risks of fatigue for GPs working in community settings are lower than most hospital-based doctors. Seventy eight (78) per cent of respondents were classified as being at a lower risk of fatigue, which compares favourably to 47 per cent of hospital doctors.

The limited data provided does show that GPs/GP registrars can still work similar hours to hospital-based doctors, despite being at a lower fatigue risk. The average of total hours worked in the 2016 audit week was 57 hours for hospital doctors in the significant risk category, whereas it was 55 hours for GPs/GP registrars. It would appear that the lower risks of fatigue for GPs/GP registrars is a product of different rostering arrangements in community settings, with the survey data showing that they do not appear to face the same extremes in shift lengths that are encountered when working in the hospital system. The maximum length of shift for GPs/GP registrars was 24 hours compared to 48 hours for hospital doctors. Due to the small sample size, the other data collected in relation to GP registrars is not discussed here.

9. Conclusion

Since the AMA embarked on its safe working hours campaign in the mid-1990s, there has been a significant reduction in the number of doctors whose working hours expose them to higher risks of fatigue.

While the trend towards hospital-based doctors working hours and rosters that reduce the risks of fatigue has continued in 2016, the rate of improvement appears to have plateaued. One in two doctors (53 per cent) are still working rosters that put them at significant and higher risk of fatigue to the extent that it could impair performance, and affect the health of the doctor and the safety of the patient.

The 2016 Audit revealed that three out of four Intensivists (75 per cent) and Surgeons (73 per cent) reported to work rosters that place them at significant and higher risk of fatigue, significantly more than the 53 per cent reported by all doctors. Further, there is evidence that extreme rostering practices remain with shifts of up to 76 hours and working weeks of 118 hours reported amongst doctors at higher risk of fatigue.

Other findings that warrant further investigation include the increase in number of Interns/RMOs in the 2016 Audit who are working rosters that place them at higher risk of fatigue. Evidence suggests that many medical students find the transition to the intern year stressful, and working long hours with fewer breaks is not conducive to doctor health and wellbeing, patient safety and quality of care.

The disproportionate number of Registrars working shifts that place them at significant and higher risk of fatigue is also of note. This highlights the imperative for Medical Colleges, in conjunction with hospitals, to review training and service requirements, and to implement systems that help doctors at this stage of their career to balance training and service requirements with personal health and wellbeing.

Similarly, while the profile of doctors working longer hours has decreased across medical disciplines since 2001, many procedural specialties are still working long hours with fewer breaks. In particular, doctors in the specialty of Obstetrics and Gynaecology reported an almost 100 per cent increase in the proportion of doctors in the high risk of

fatigue category in this audit. While these findings are not definitive, this result warrants further evaluation, noting that doctors can still work significant hours provided appropriate arrangements are in place to manage the risk of fatigue.

The 2016 Audit confirms that doctors at higher risk of fatigue and impaired performance typically work longer hours, longer shifts, have more days on call, less days off and are more likely to skip a meal break. These triggers should be used by hospitals, training providers, clinical safety and quality organisations, professional associations and doctors as red flags for fatigue and steps taken to manage that risk accordingly. This could include revising work and rostering practices, job redesign, revised training practices and better use of technology, specific workplace initiatives, and educational programs aimed at improving the work and training environment.

Along with changing attitudes to safe hours, increasing numbers of prevocational and vocational trainees, and a growing emphasis on efficiency within the hospital sector, the AMA's work on fatigue management to date including the development of an AMA National Code of Practice on Hours of Work, Shiftwork and Rostering for Hospital Doctors, has been instrumental in shifting workplace practice. This has been achieved without the need for the rigid restrictions on working hours that have been introduced in Europe and the United States. The results of this audit reiterate the value of organisations adopting the principles set out in the Code as formal policy and in engaging resources to undertake a cultural change program on work and training practices within their sphere of influence.

There is now a bank of research that links the effects of fatigue to a greater risk of human error and harm to both patients and doctors. While there has been an improvement in the risk profile of doctors since 2001, the 2016 Audit suggests that extremes in hospital doctor working hours still persist, and many hospital doctors continue to work rosters that place them at higher risk of fatigue. Particular attention must be paid to provide all doctors at all stages of their career with a safe working environment. Research shows that this not only benefits the health and wellbeing of doctors but contributes to higher quality care, patient safety, and health outcomes.

As the evidence regarding doctor fatigue and patient safety accumulates, achieving safe working hours will require intelligent solutions beyond a simple restriction in working hours. The challenge in the Australian context is how to balance this with the demands of training and service delivery, in an environment where long working hours are no longer synonymous with professionalism, and there is a growing emphasis on achieving a healthy work-life balance.

The AMA Safe Hours Audit series is one part of a broader education and awareness program to improve understanding about the risks fatigue creates for individual health and safety and quality of patient care. The results of the audit should be used to assess individual and organisational practice, beliefs and culture, and to implement strategies that support safer working hours, patterns and environments for hospital doctors and doctors in training.

Appendix

APPENDIX 1 Respondents by classification

	Percentage				
	2016	2011	2006	2001	Change (2016-2001)
Interns/ RMOs	38%	46%	39%	56%	**-32%**
Registrars	43%	33%	53%	36%	**19%**
CMOs	1%	2%	–	–	**N/A**
Consultants	18%	20%	8%	8%	**126%**
Total	**100%**	**100%**	**100%**	**100%**	

Note: In 2006, CMOs and Consultants were grouped together.

APPENDIX 2 Respondents by clinical discipline

	Percentage				
	2016	2011	2006	2001	Change (2016-2001)
Medicine/ Physician	32%	32%	49%	19%	**66%**
Surgery	13%	17%	13%	20%	**-35%**
Emergency Medicine	11%	12%	9%	13%	**-17%**
Anaesthesia	10%	8%	4%	7%	**36%**
Intensive Care	8%	N/A	N/A	N/A	**N/A**
O&G	7%	7%	10%	7%	**-4%**
Psychiatry	7%	N/A	N/A	N/A	**N/A**
Other	14%	23%	15%	34%	**-59%**
Total	**100%**	**99%**	**100%**	**100%**	

APPENDIX 3 Respondents by classification and risk category

	All Doctors					Interns/ RMOs				
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Lower	47%	47%	38%	22%	**114%**	51%	48%	39%	20%	**155%**
Significant	43%	41%	45%	54%	**-21%**	39%	43%	48%	57%	**-32%**
Higher	10%	12%	17%	24%	**-57%**	10%	9%	13%	23%	**-57%**
Total	**100%**	**100%**	**100%**	**100%**		**100%**	**100%**	**100%**	**100%**	

	Registrars					Consultants/ CMOs				
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Lower	41%	42%	38%	25%	**63%**	53%	53%	33%	24%	**121%**
Significant	48%	40%	42%	48%	**1%**	38%	36%	49%	58%	**-35%**
Higher	11%	18%	20%	27%	**-59%**	9%	11%	18%	18%	**-48%**
Total	**100%**	**100%**	**100%**	**100%**		**100%**	**100%**	**100%**	**100%**	

	All Doctors	Interns/ RMOs	Registrars	Consultants/ CMOs
	2016 - 2011 Change	2016 - 2011 Change	2016 - 2011 Change	2016 - 2011 Change
Lower	0%	6%	-3%	0%
Significant	4%	-9%	21%	4%
Higher	-13%	11%	-39%	-15%

NOTE: All data excludes General Practice data.

APPENDIX 4 Trends by risk categories

	2016	2011	2006	2001	Change (2016-2001)	Change (2016-2011)
Lower	47%	47%	38%	22%	**114%**	**0%**
Significant	43%	41%	45%	54%	**-21%**	**4%**
Higher	10%	12%	17%	24%	**-57%**	**-13%**
Higher + Significant	**53%**	**53%**	**62%**	**78%**	**-32%**	
Total	**100%**	**100%**	**100%**	**100%**		

	2016			
	All Doctors	Interns/ Residents	Registrars	CMOs/ Consultants
Lower	47%	51%	41%	53%
Significant	43%	39%	48%	38%
Higher	10%	10%	11%	9%
Higher + Significant	**53%**	**49%**	**59%**	**47%**
Total	**100%**	**100%**	**100%**	**100%**

APPENDIX 5 Trends in clinical discipline by risk category

	Lower Risk					Significant Risk				
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Medicine/ Physician	46%	46%	36%	14%	**229%**	45%	45%	48%	51%	**-12%**
Surgery	28%	23%	15%	14%	**96%**	53%	51%	49%	51%	**4%**
Emergency Medicine	62%	66%	71%	41%	**50%**	37%	27%	27%	45%	**-18%**
Anaesthesia	69%	62%	60%	32%	**115%**	27%	34%	36%	54%	**-51%**
Intensive Care	25%	N/A	N/A	N/A	**N/A**	56%	N/A	N/A	N/A	**N/A**
O&G	42%	74%	28%	7%	**503%**	40%	17%	51%	52%	**-23%**
Psychiatry	65%	N/A	N/A	N/A	**N/A**	30%	N/A	N/A	N/A	**N/A**
Other	48%	52%	43%	25%	**92%**	42%	35%	45%	53%	**-21%**
All Respondents	47%	47%	38%	22%	**114%**	43%	41%	45%	54%	**-21%**

	Higher Risk					Lower Risk	Sig. Risk	Higher Risk
	2016	2011	2006	2001	Change (2016-2001)	Change (2016 - 2011)		
Medicine/ Physician	9%	9%	16%	35%	**-75%**	0%	0%	-1%
Surgery	20%	26%	36%	35%	**-43%**	20%	4%	-24%
Emergency Medicine	1%	6%	2%	14%	**-90%**	-7%	37%	-77%
Anaesthesia	5%	4%	4%	14%	**-66%**	11%	-22%	18%
Intensive Care	19%	N/A	N/A	N/A	**N/A**	N/A	N/A	N/A
O&G	18%	9%	21%	41%	**-57%**	-43%	135%	98%
Psychiatry	4%	N/A	N/A	N/A	**N/A**	N/A	N/A	N/A
Other	10%	13%	12%	22%	**-54%**	-8%	19%	-22%
All Respondents	10%	12%	17%	24%	**-57%**	0%	4%	-13%

APPENDIX 6 Range of total hours worked by risk category - seven day audit period

	Longest Shift (Hours)				Average Hours					
	2016	2011	2006	2001	2016	2011	2006	2011	Change (2016-2001)	Change (2016-2011)
Lower	1 to 60	0 to 62	0 to 62	10 to 74	43	44	45	45	**-5%**	**-3%**
Significant	5 to 88	3 to 85	9 to 91	34 to 86	57	60	60	60	**-5%**	**-5%**
Higher	49 to 118	46 to 120	50 to 113	45 to 106	78	78	78	79	**-1%**	**0%**

NOTE: All data excludes General Practice data.

APPENDIX 7 Longest continuous period of work by risk category - seven day audit period

| | Longest Shift (Hours) | | | | Average Hours | | | | | |
	2016	2011	2006	2001	2016	2011	2006	2011	Change (2016-2001)	Change (2016-2011)
Lower	37	0 to 19	0 to 18	5 to 21	12	12	12	11	**5%**	**-4%**
Significant	59	0 to 34	9 to 35	5 to 24	14	14	15	13	**4%**	**-4%**
Higher	76	9 to 43	10 to 39	7 to 63	18	16	16	16	**14%**	**14%**

APPENDIX 8 Full days free of work by risk category – seven day audit period

| | No days free of work | | | | | One day free of work | | | | | Two or more days free of work | | | | |
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Lower	2%	2%	4%	9%	**-82%**	13%	22%	16%	17%	**-24%**	86%	85%	80%	74%	**16%**
Significant	22%	28%	24%	32%	**-31%**	35%	35%	38%	39%	**-11%**	43%	38%	38%	29%	**49%**
Higher	71%	72%	72%	81%	**-12%**	17%	19%	17%	11%	**55%**	11%	9%	11%	8%	**43%**

| | No days free of work | One day free of work | Two or more days free of work |
	Change (2016 - 2011)	Change (2016 - 2011)	Change (2016 - 2011)
Lower	-20%	-41%	1%
Significant	-21%	-1%	14%
Higher	-1%	-10%	27%

APPENDIX 9 Days on-call by risk category - seven day audit period

| | None | | | | | One or two days | | | | | Three or more days | | | | |
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Lower	73%	74%	68%	70%	**4%**	25%	22%	28%	25%	**-1%**	2%	4%	4%	5%	**-56%**
Significant	55%	52%	48%	52%	**5%**	27%	30%	36%	30%	**-9%**	18%	18%	16%	18%	**1%**
Higher	47%	32%	35%	50%	**-6%**	11%	18%	26%	19%	**-40%**	41%	49%	39%	31%	**34%**

| | None | One or two days | Three or more days |
	Change (2016 - 2011)	Change (2016 - 2011)	Change (2016 - 2011)
Lower	-1%	13%	-45%
Significant	5%	-9%	1%
Higher	47%	-37%	-16%

APPENDIX 10 Days without a meal break by risk category - seven day audit period

| | None | | | | | One or two days | | | | | Three or more days | | | | |
	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)	2016	2011	2006	2001	Change (2016-2001)
Lower	53%	47%	93%	49%	**7%**	28%	28%	7%	19%	**47%**	20%	25%	0%	32%	**-39%**
Significant	40%	26%	83%	30%	**32%**	25%	25%	16%	26%	**-2%**	35%	50%	1%	44%	**-21%**
Higher	33%	21%	75%	31%	**6%**	21%	21%	18%	25%	**-14%**	46%	58%	7%	44%	**4%**

| | None | One or two days | Three or more days |
	Change (2016 - 2011)	Change (2016 - 2011)	Change (2016 - 2011)
Lower	0%	0%	0%
Significant	12%	0%	-22%
Higher	53%	2%	-30%
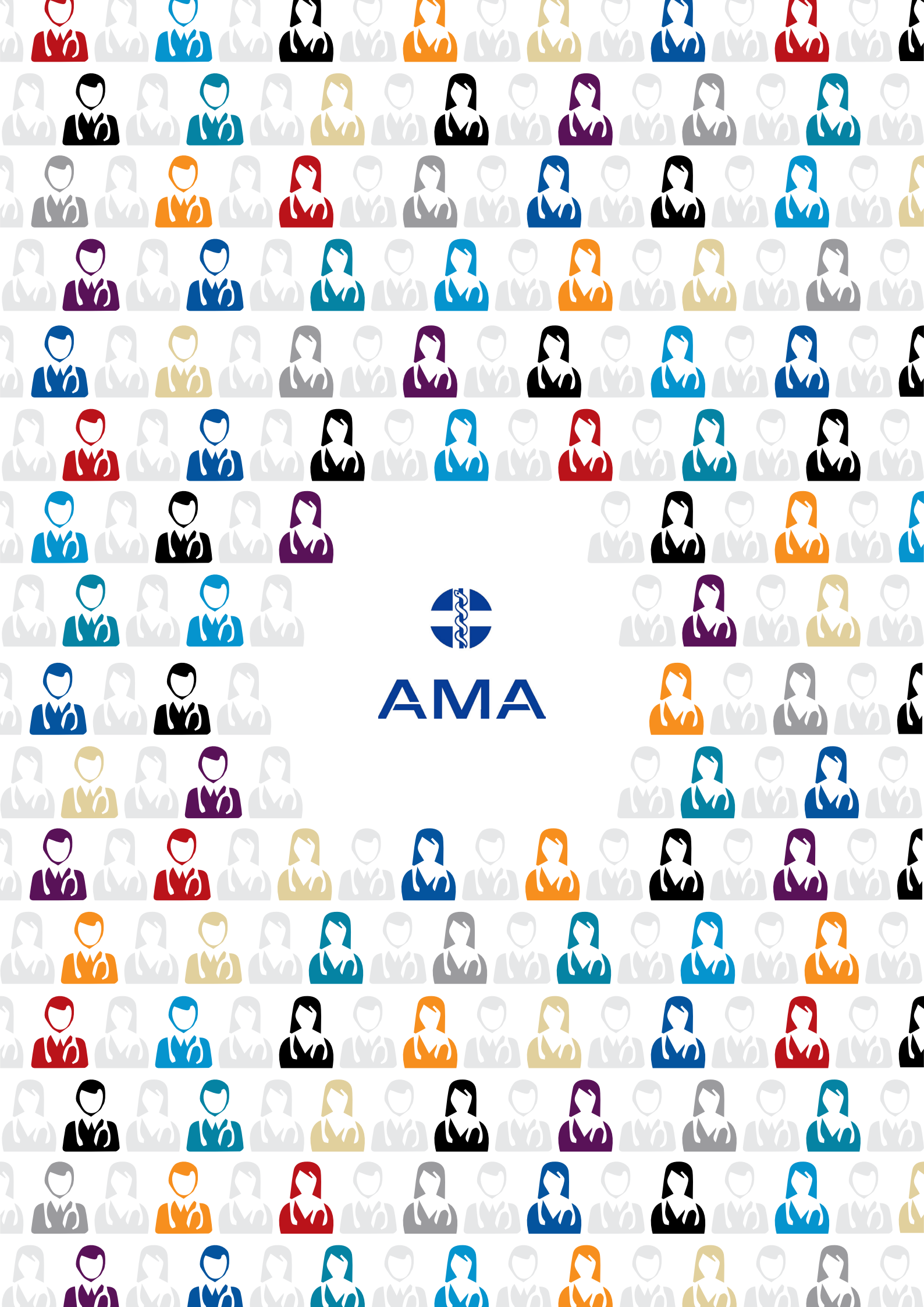
NOTE: All data excludes General Practice data.

AMA

MANAGING THE RISK OF FATIGUE IN THE MEDICAL WORKFORCE

AMA Safe Hours Audit 2011

Executive Summary

There is a tradition of onerous working hours in the medical profession. There has long been an expectation that doctors work extended shifts and demanding on-call rosters, without diminishing their ability to apply their professional knowledge and skills to the highest standard.

But evidence from around the world has shown that excessive working hours and fatigue affect patient safety as well as the health and wellbeing of doctors. [1,2,3] The impairment to the performance of an individual after 17 hours of sustained wakefulness has been shown to be equivalent to that of a blood alcohol concentration greater than 0.05 per cent.[4]

As part of an ongoing campaign, the AMA in August last year conducted its third nationwide survey of doctors' working hours to assess the fatigue risks of their current working arrangements. While previous audits have focused on hospital doctors, the 2011 survey was extended to cover General Practice (GP) registrars working in community settings.

The survey was conducted using an online tool that collected data on the hours of work, on-call hours, non-work hours, and the sleep time of doctors during the audit week (8–14 August 2011). Both AMA members and non-members were invited by email to participate.

The data was independently analysed by Kilham Consulting Pty Ltd against an established risk assessment model developed by the AMA in 2000. Participants were categorised into three different risk levels: lower, significant and higher. In determining the level of risk, the model took into account factors such as total weekly hours, the amount of night work, the length of shifts, the extent of on-call commitments, access to breaks, and the long-term work pattern.

The survey, in which 1,486 doctors took part, shows that since the AMA undertook its first safe hours audit in 2001, there has been a sustained decline in the risks of fatigue, based on the proportion of doctors that fall into the significant and higher risk levels. However, many hospital-based doctors are still working rosters that potentially impair their performance.

The risk assessment data collected by the AMA indicates the performance of hospital doctors in the higher risk category, and many in the significant risk category, would, at times, be impaired to the extent of affecting the safety of medical care provided to patients. If this performance impairment were the result of alcohol intoxication, prevailing hospital policies would prevent these doctors from working.

The audit also reveals that GP registrars working in community settings are generally at lower risk of fatigue than their colleagues working in the hospital system. The results of the survey with respect to GP registrars are dealt with separately.

1   Australian Council for Safety and Quality in Health Care and Australian Health Ministers' Conference. Safe staffing : discussion paper / Safety+Quality Council. Canberra: ACSQHC, 2003.

2   Ulmer C, Wolman DM, Johns MME, eds. Resident Duty Hours: Enhancing Sleep, Supervision, and Safety. Washington, DC: The National Academies Press: 2009.

3   Canadian Association of Internes and Residents. Position Paper on Resident Duty Hours. Canadian Patient and Physician Safety and Wellbeing: Resident Duty Hours. Ottawa: CAIR, 2012.

4   Dawson D, Reid K. Fatigue, alcohol and performance impairment. *Nature* 1997; 388: 235.

Summary of results for hospital-based doctors

The AMA survey reveals that the hours and patterns of work for 53 per cent of hospital-based doctors fall into significant risk and higher risk categories. This represents an improvement compared with the 2006 survey results, where 62 per cent of respondents fell into the significant risk and higher risk categories. In 2001, this figure was 78 per cent (see Graph 1).

GRAPH 1 – Percentage of doctors classified at the significant and higher risk levels.
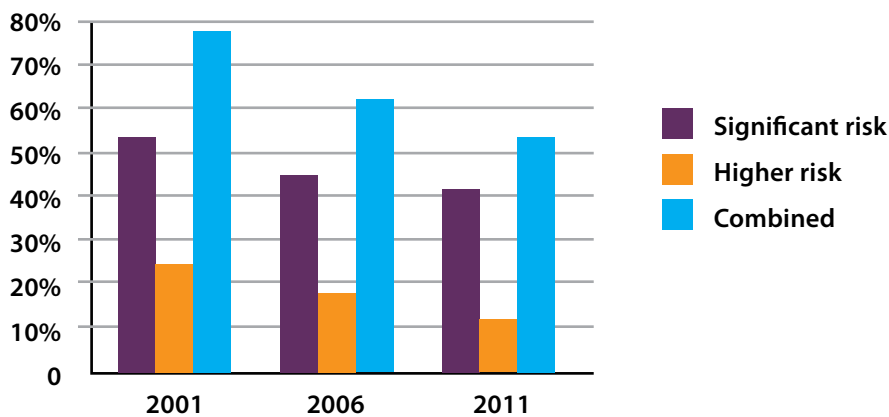
The overall trend of continued improvement is welcome, although the audit clearly shows that extremes still exist and, in some cases, they have become worse. For example:

- in 2011, 21 per cent of doctors had no days free from work during the audit period;

- the longest recorded shift increased from 39 hours in 2006 to 43 hours in 2011; and

- the maximum total number of hours worked during the audit week actually went up (from 113 in 2006 to 120 in 2011).

The average of total hours worked in the 2011 audit week for all hospital doctors was 55.1 hours.

Conclusions

The 2011 Safe Hours Audit results show that the riskiest work patterns are still too common in our hospital system. Although various changes, including shifts in attitude, better rostering, industrial regulations, and increased graduate numbers, seem to have helped improve matters, unsafe practices persist.

In any other industry or profession, these statistics would be cause for deep concern and immediate action. Further improvement in the rostering in our hospital system – backed by appropriate resources and systems to ensure that the continuity of patient care is not compromised – would lead to lower risk of fatigue without necessarily reducing actual work hours.

The AMA will continue to lobby for improvements in the management of fatigue as a key patient safety issue. Clearly, there is no room for complacency.

Background

There is a tradition of onerous working hours in the medical profession. It has been expected that doctors will be able to sustain the highest professional standards despite working extended shifts and demanding on-call rosters.

In the past, some in the profession believed that rigorous training systems for doctors ensured that they could continue to function effectively through 24-hour shifts, continuous on-call rosters, little sleep, and short breaks between episodes of work.

Until relatively recently, little effort has been made to study the effects of punishing work schedules on the wellbeing of doctors or the patients in their care. In the 1990s, however, doctors, along with others interested in safety and quality, began questioning the practice.

Effects of fatigue

A large body of evidence attests to the deleterious effects of excessive working hours on patient safety, principally through increased medical errors. For instance, a 2004 study in the *New England Journal of Medicine* [5] showed that interns made 35.9 per cent more serious medical errors when rostered for frequent shifts exceeding 24 hours than they did when working shorter shifts.

Fatigue also affects the health and wellbeing of doctors, both directly and indirectly. A separate *New England Journal of Medicine* paper [6] considered the relationship between the risks of motor vehicle crashes and extended work shifts among interns in the United States. Researchers found that:

- the odds of an intern being involved in a motor vehicle crash after working an extended shift were more than double that for interns working non-extended shifts;

- near-miss accidents were more than five times more likely to occur after an extended work shift as they were after a non-extended shift; and

- in the months that interns worked five or more extended shifts, they were up to almost four times more likely to fall asleep while driving or stopped in traffic.

In 2004, the Royal College of Physicians in the United Kingdom undertook an eight-week study [7] examining specialist registrars working 13-hour night shifts over seven consecutive nights, with the results highlighting that:

- participants reported excessive fatigue or tiredness during their shift on just over 50 per cent of shifts;

- 65 per cent of participants felt that working an extended pattern of night shifts affected the quality of care provided to patients;

- 74 per cent of participants felt that care in the hospital at night was 'worse' or 'much worse' than that available during the day; and

- according to several different measures, participants were at their lowest ebb on nights four and five in the shift cycle.

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5   Landrigan CP, Rothschild JM, John W. Cronin JW, et al. Effect of Reducing Interns' Work Hours on Serious Medical Errors in Intensive Care Units. N *Engl J Med* 2004; 351:1838-1848.

6   Barger LK, Cade BE, Ayas, NT, et al. for the Harvard Work Hours, Health, and Safety Group. Extended Work Shifts and the Risk of Motor Vehicle Crashes among Interns. *N Engl J Med* 2005; 352:125-13.

7   Horrocks N, Pounder R;. Working the Night Shift An audit of the experiences and views of specialist registrars working a 13-hour night shift over 7 consecutive nights. London: Royal College of Physicians and Centre for Gastroenterology, 2004.

In 2003, the Australian Council for Safety and Quality in Health Care published a 'Safe Staffing' Discussion Paper [8] that brought together much of the available overseas evidence on the risks of fatigue. This paper not only dealt with the health sector, but other sectors of the economy such as the airline industry.

More recently, the Institute of Medicine in the United States has also conducted an extensive review of the consequences of unsafe working hours and other rostering practices. It concluded that "fatigue is an unsafe condition that contributes to reduced wellbeing for residents and increased errors and accidents." [9] Other international papers have reached a similar conclusion. [10,11]

Managing risk in Australia

In contrast to other countries, working hours in Australia are not specifically regulated and are instead determined by industrial instruments and within the general obligations imposed by occupational health and safety legislation. As a consequence, Australian doctors work a wide variety of hours and under a broad range of roster structures.

The AMA launched its Safe Hours campaign in the mid-1990s. Central to this was the development of a National Code of Practice for working hours and rostering practices. To some extent, improving observance of the Code has obviated the need for Australia to adopt a more rigid approach to managing fatigue.

AMA National Code of Practice

After a lengthy consultation process supported by the Federal Government, the AMA's *National Code of Practice – Hours of Work, Shiftwork and Rostering for Hospital Doctors* was issued in 1999. It is available on the AMA website. [12]

The Code does not contain absolute, enforceable limits on single elements such as the maximum length of a safe shift or the break required between episodes of work. The level of fatigue and the consequent effect on safety and work performance is complicated and is the product of a range of factors.

Those factors are identified in the Code, which contains a *Risk Assessment Guide* and a *Risk Assessment Checklist* to help assess the risk level of an individual's working hours. The Code provides the tools to identify unsafe working hours and reduce the associated risk levels.

The AMA Code now stands as the accepted standard for safe working hours for hospital doctors in Australia. Organisations including the Australian Council for Safety and Quality in Health Care, the Australian Council on Healthcare Standards, and State Postgraduate Medical Councils have made reference to the Code.

8   Australian Council for Safety and Quality in Health Care and Australian Health Ministers' Conference. Safe staffing : discussion paper. Canberra: ACSQHC, 2003.

9   Ulmer C, Wolman DM, Johns MME, eds. Resident Duty Hours: Enhancing Sleep, Supervision, and Safety. Washington, DC: The National Academies Press: 2009.

10   Moonesinghe SR, Beard JD. Impact of reduction in working hours for doctors in training on postgraduate medical education and patients' outcomes: systematic review. *BMJ* 2011;342:d1580.

11   Canadian Association of Internes and Residents. Position Paper on Resident Duty Hours. Canadian Patient and Physician Safety and Wellbeing: Resident Duty Hours. Ottawa: CAIR, 2012.

12   Australian Medical Association. National Code of Practice – Hours of Work, Shiftwork and Rostering for Hospital Doctors. Canberra: AMA, 2005.

AMA risk assessment audits

In order to monitor the impact of the Code, the AMA in 2000 developed a model to assess a rostered week against identified risk factors for fatigue. The model creates a numerical score, which translates to a risk rating (see methods later in this report).

2001 Safe Hours Campaign: Risk Assessment of Junior Doctor Rosters

In 2001, the AMA conducted a national audit of junior doctors' working hours using this model, which is available on the AMA website. [13] The survey found that 78 per cent of respondents fell into the significant risk or higher risk levels during the audit period. Total hours for some higher risk doctors exceeded 100 per week, with one doctor reporting a period of 63 hours of continuous hospital duty.

Twenty four per cent of doctors in the higher risk category averaged 80 work hours during the audit week, with 81 per cent of them not having a single full day free of work in that week.

It was clear in 2001 that much remained to be done to tackle the entrenched culture of unsafe working hours.

2006 Safe Hours Campaign: Safe Hours = Safe Patients, AMA Safe Hours Audit 2006

The AMA Safe Hours Audit 2006 [14] was conducted using the same tool. It was extended to cover senior doctors and found that 62 per cent of hospital doctors were working hours that put them at risk of fatigue.

Some indicators showed signs of improvement. For example, for doctors in the higher risk category, the longest continuous period of work fell from 63 hours to 39 hours. Doctors also had more full days off work during the audit week and more opportunities for meal breaks when working.

The audit showed that, while modest improvements had been achieved, too many doctors were working hours that left them at significant and higher risk of fatigue. In the main, though, some extremes had been moderated.

Overseas experience in managing risk

There has been considerable progress made towards limiting the working hours of doctors in Europe and North America, principally through regulation and legislation. The effect of these measures on patient safety, doctor health and wellbeing, and medical education is starting to be evaluated.

Initial evidence suggests that cutting work hours has not had any detrimental effect on patient safety or the learning outcomes of doctors in training. The *British Medical Journal* recently conducted a review of 72 studies assessing the impact of a change in working hours on postgraduate medical training, patient safety and clinical outcomes.[15] The review concluded that cutting working hours to less than 80 hours a week in the United States had not adversely affected patients or postgraduate training outcomes. The authors suggested that there was insufficient data to draw any conclusions about the impacts of reducing hours (to less than 56 or 48 a week) in the United Kingdom.

13   Australian Medical Association. AMA Safe Hours Campaign. Risk assessment of junior doctor rosters. Canberra: AMA, 2001.

14   Australian Medical Association. Safe Hours = Safe Patients. AMA Safe Hours Audit 2006. Canberra: AMA, 2006.

15   Moonesinghe SR, Beard JD. Impact of reduction in working hours for doctors in training on postgraduate medical education and patients' outcomes: systematic review. *BMJ* 2011;342:d1580.

Conversely, there is no conclusive evidence that reduced working hours, in isolation, have a positive effect on patient safety.[16] This suggests that, in order to improve clinical outcomes, reduced working hours must be supported by other changes, including better staffing levels and dedicated patient handover arrangements.

The 2011 audit in context

Much has changed in Australia since the National Code of Practice was first launched in 1999.

For one, the medical workforce has expanded considerably. Over the last decade, the number of registered practitioners has increased by almost half, rising from 57,553 registrations in 1999 to 82,895 in 2009.[17] This in part reflects an influx of medical graduates from overseas, as well as significant increases in the number of graduates from Australian medical schools. Industrial agreements in most jurisdictions have also changed considerably, with increasing recognition of the need for a comprehensive approach to the management of fatigue.

Although these developments have helped cut average working hours across the profession, [18] the extent to which they have ameliorated other unsafe practices remains unclear. Much of the broader reduction in average working hours of doctors has been attributed to an increasing number of women in the workforce, who tend to work fewer hours than men. This may have masked the extent to which unsafe practices are evident, because crude measures (such as average working hours) do not reflect the extreme arrangements that occur in some settings and disciplines.

In tandem with this expansion in the medical workforce, demand for public hospital services has also increased. Between 2006-07 and 2010-11, the number of admissions to public hospitals grew on average by 3.2 per cent a year, while the annual growth in emergency department presentations averaged 3.2 per cent and outpatient services grew an average of 2 per cent a year. [19] These strong rates of growth have not been matched by appropriate increases in funding and resources, and this has placed additional pressures on doctors working in public hospital settings.

For these reasons, the 2011 Safe Hours Audit is a timely study of fatigue in the medical workforce.

16   Ibid.

17   Health Workforce Australia. Australia's Health Workforce Series Doctors in focus. Adelaide: HWA, 2012.

18   Ibid.

19   Australian Institute of Health and Welfare. Australian hospital statistics 2010-11. Canberra: AIHW, 2012. (AIHW Cat. No. HSE 117; Health Services Series No. 43.)

Methods

The 2011 Safe Hours Audit was conducted using an online tool that collected data on the hours of work, on-call hours, non-work hours, and sleep time during one week (8-14 August 2011). An invitation to complete the survey was forwarded to doctors by e-mail, and AMA members and non-members were able to participate. Details of the audit were also published in *Australian Medicine*, State AMA publications and the social media platforms, Twitter and Facebook.

Data was independently analysed by Kilham Consulting Pty Ltd against an established risk assessment model developed by the AMA in 2000. This model considers factors such as total weekly hours, the quantity of night work, the length of shifts, the extent of on-call commitments, access to breaks, and the long term work pattern. Using a validated scoring system, the model categorises doctors into three different risk levels: lower, significant and higher risk.

Risk assessment model

The model's scoring system rests on a simple points calculation.[20] Points are added or subtracted for shifts that exceed 14 hours per day, where no work breaks are taken during shifts, for on-call commitments, where the doctor has no full day off in a week, and where the break between shifts is less than 10 hours. Points are weighted for hours worked at night because of the association with greater fatigue. They are also allocated on the basis of work schedules in the previous and forthcoming week.

While the AMA risk assessment audit methodology does not provide a precise measurement of fatigue and performance impairment, it is an indicator of the level of risk associated with specific work schedules.

20   Australian Medical Association. AMA Safe Hours Campaign. Risk assessment of junior doctor rosters. Canberra: AMA, 2001.

Results and Discussion

The audit had 1,486 valid responses. A majority of these were from hospital-based doctors.

Hospital-based doctors

Sample

A total of 1399 hospital doctors completed usable risk assessments, of whom 46 per cent were Interns or Resident Medical Officers (RMOs), 33 per cent Registrars, 2 per cent were Career Medical Officers (CMOs), and 20 per cent were Consultants.

TABLE 1 – Respondents by Classification

	Percentage
Intern/RMO	46%
Registrars	33%
CMO	2%
Consultant	20%
TOTAL	**100%**

TABLE 2 – Respondents by Clinical Discipline

	Percentage
Medicine/Physicians	32%
Surgery	17%
Emergency Medicine	12%
Obstetrics and Gynaecology	7%
Anaesthetics	8%
General Practice*	2%
Other	23%
TOTAL	**100%**

*   *GPs have been included in the analysis of hospital doctors, where it could be established that they were working in hospitals on a part time or other basis. In this regard, GPs are acknowledged as being critical to the provision of hospital services in rural and remote areas.*

Risk by classification

The variation in fatigue risk among different classifications of doctors is shown in Table 3. There has been a general improvement in risk levels compared with previous audits, as can be seen in Graphs 2 and 3. For all hospital doctors, the proportion in the higher and significant risk categories fell compared with the 2006 report (from 62 per cent), with a corresponding rise in the lower risk category (from 38 per cent). Fifty three per cent of hospital doctors are still in the significant risk and higher risk categories.

TABLE 3 – Respondents by classification and risk category

Risk Category	All Doctors	Intern/RMO	Registrars	CMO/Cons
Lower	47%	48%	42%	53%
Significant	41%	43%	40%	36%
Higher	12%	9%	18%	11%
TOTAL	**100%**	**100%**	**100%**	**100%**

GRAPH 2 – Trends in significant risk category

Percentage of doctors in significant risk category
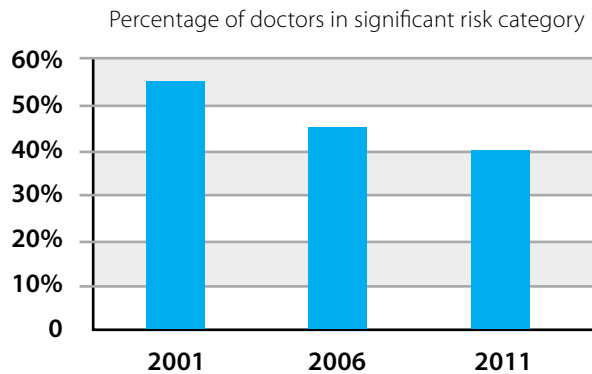
GRAPH 3 – Trends in high risk category
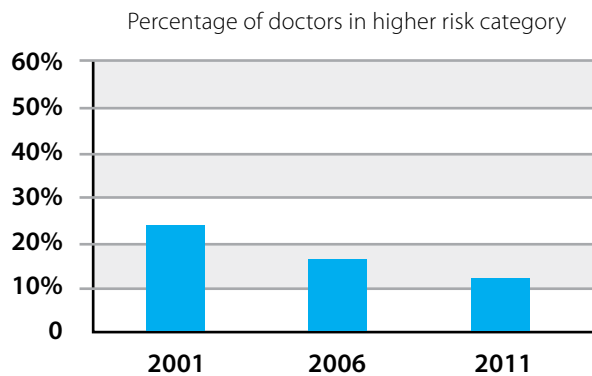
Percentage of doctors in higher risk category

Risk by discipline

There was significant variation in risk categories within and between different clinical disciplines (Table 4 and Graph 4).

TABLE 4 – Clinical discipline by risk category

Clinical Discipline	Lower	Significant	Higher	Total
Medicine/Physician	46%	45%	9%	**100%**
Surgery	23%	51%	26%	**100%**
Emergency Medicine	66%	27%	6%	**100%**
Anaesthetics	62%	34%	4%	**100%**
General Practice	35%	48%	17%	**100%**
Obstetrics and Gynaecology	74%	17%	9%	**100%**
Other	52%	35%	13%	**100%**
All respondents	**47%**	**41%**	**12%**	**100%**

GRAPH 4 – Risk categories by clinical discipline
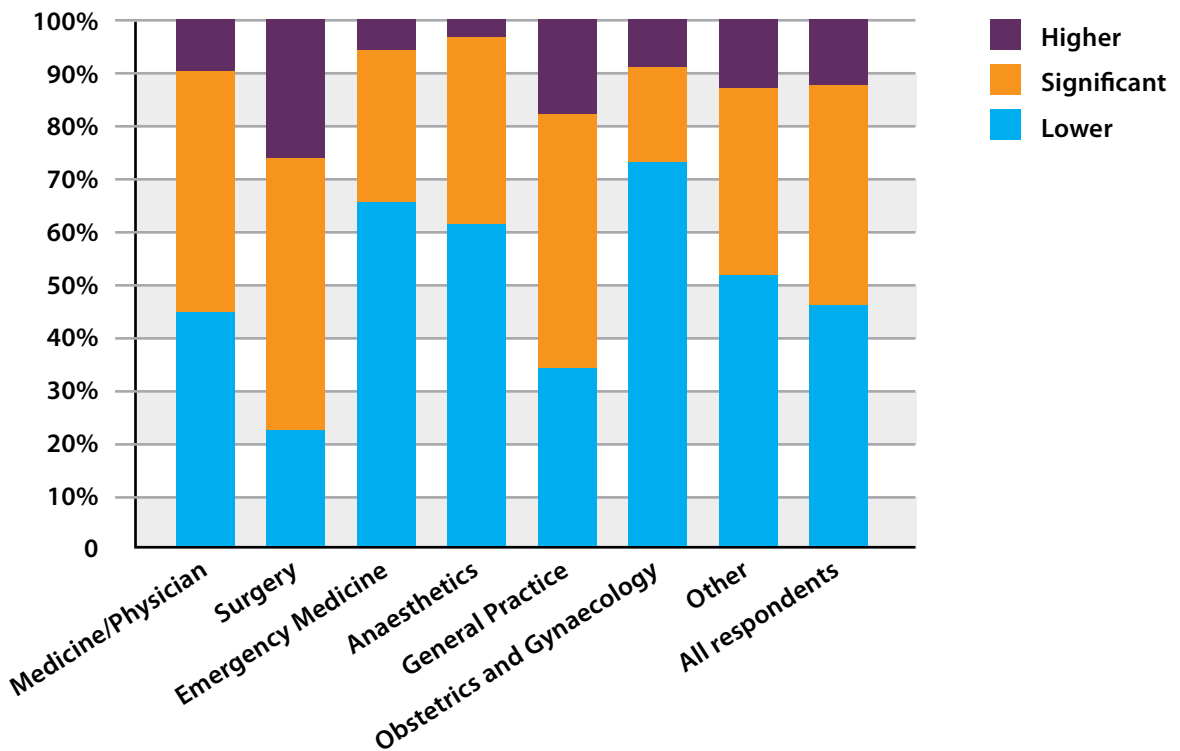
Compared with the 2006 audit results, the risk profile of most disciplines has improved, noting that General Practice has not been included in previous reports. Obstetrics and gynaecology has improved markedly, with 74 per cent of respondents falling into the lower risk category (against 28 per cent in 2006). Medicine/Physicians has also achieved further improvements in its risk profile, with 46 per cent in the lower risk category (against 36 per cent in 2001).

With the exception of emergency medicine, all medical disciplines have achieved a reduction in the higher risk category.

The results in the surgical category show progress, with the number of respondents in the lower risk category growing from 15 per cent in 2006 to 23 per cent in 2011. This may be the result of sustained efforts by the AMA, along with the Royal Australasian College of Surgeons (RACS), to publicly recognise the effects of fatigue on performance, and to address cultural and systemic issues regarding work hours. However, surgery still has some way to go, with the proportion of its practitioners in the higher risk category twice the average. This finding is supported by a recent study of surgical trainees [21] that found trainees averaged 61.4 hours per week, with 5 per cent working more than 80 hours a week. On-call shifts were worked by 73.5 per cent, for an average of 27.8 hours per week.

One of the reasons that change in the specialty has been slow in coming is the perceived effect of reduced working hours on training opportunities. The Royal Australasian College of Surgeons Trainees Association (RACSTA) has recently determined that rosters of approximately 60 hours per week provide an appropriate balance of working hours for surgical training, although study and lifestyle demands are better accommodated with fewer hours.[22] They concluded that sleep loss is an important determinant of fatigue and its impacts, and work hours should not be considered in isolation.

For these reasons, more sophisticated practice and rostering arrangements are required. These should minimise the risk of fatigue but also ensure access to essential training opportunities such as operating theatre and outpatient clinic sessions. Reports from overseas indicate this is possible, but requires changes to way services are delivered, as well as explicit recognition of the importance of medical education. [23, 24]

Working hours

According to the survey, hospital doctors worked an average of 55.1 hours a week last year – a result that correlates with other recent Australian data.[25, 26]

There was significant overlap in the range of total hours worked between the lower risk, significant risk, and higher risk groups (Table 5). This illustrates the point that other variables, along with the total number of hours worked in a week, influence the final risk rating of the work schedule. These include whether the work was performed in the day or at night, the frequency of on-call commitments, opportunities for rest breaks, and the other variables identified in the risk assessment guide of the Code as contributing to the risk associated with specific rostering practices.

21   O'Grady, G, Loveday B, Harper S, et al. Working hours and roster structures of surgical trainees in Australia and New Zealand. *ANZ J Surg* 2010; 80(12):890-5.

22   O, Grady G, Harper, S, Loveday B, et al. Appropriate working hours for surgical training according to Australasian trainees. *ANZ J Surg* 2012; 82(4): 225-29.

23   Temple J. Time for Training: A Review of the impact of the European Working Time Directive on the quality of training. London: National Health Service: Medical Education England, 2010.

24   Jefferis T, Snelling J, Collins J, de Cossart L. Educating surgeons in a 48-h week: time to change mindset. *Ann. R. Coll. Surg. Engl* 2009; 91:318–20.

25   Hills D, Scott A. Focus on doctors enrolled in a specialty training program [newsletter]. MABEL Matters No. 4, December 2009. Melbourne: Melbourne Institute of Applied Economic and Social Research.

26   McIsaac M, Scott A. Focus on interns and medical Officers. [newsletter]. MABEL Matters No. 5, December 2009. Melbourne: Melbourne Institute of Applied Economic and Social Research.

There has been little change in average total hours worked by doctors at all risk levels since 2006. The longest reported working week in the 2011 audit at the higher risk level was longer than in the 2006 report (113 hours), while there is some evidence of improvement from 2006 at the significant risk level (91 hours). The low risk category is unchanged from 2006.

TABLE 5 – Range of total hours worked by risk category – seven day audit period

Risk category	Range (hours)	Average hours
Lower	0-62	44
Significant	3-85	60
Higher	46-120	78

The longest period of work and average daily hours were correlated with risk category. Table 6 indicates that among doctors in the higher risk group there has not been a return to the extreme lengths of shift revealed in the 2001 audit (63 hours). However, the audit found that the duration of the longest recorded shift has actually increased, from 39 hours in 2006 to 43 hours last year.

Aside from these variations, the range of hours worked, and overall average hours, were very similar to the 2006 audit results.

TABLE 6 – Longest continuous period of work by risk category – seven day audit period

Risk category	Range (hours)	Average hours
Lower	0-19	12
Significant	0-34	14
Higher	9-43	16

Other indicators

Table 7 indicates that 72 per cent of doctors in the higher risk group had no day free of work during the seven day audit period – unchanged from the 2006 audit results. While more doctors in the low risk category had two or more days free of work (85 per cent versus 80 per cent in 2006), there is no clear evidence of sustained improvement overall.

TABLE 7 – Full days free of work by risk category – seven day audit period

Risk category	Days free of work		
	None	One	Two or more
Lower	2%	22%	85%
Significant	28%	35%	38%
Higher	72%	19%	9%

On-call commitments are a factor in fatigue and risk levels. Table 8 and Graph 5 indicate the significant on-call commitments of hospital doctors. For those in the significant risk and higher risk categories, the figures for three or more days on-call have increased compared to 2006 (16 per cent and 39 per cent respectively). For those in the higher risk category, only 32 per cent had no on-call commitments during the audit week, against 35 per cent in 2001.

TABLE 8 – Days on-call by risk category – a seven day audit period

Risk category	Number of days		
	None	One or two	Three or more
Lower	74%	22%	4%
Significant	52%	30%	18%
Higher	32%	18%	49%

GRAPH 5 – Days on-call by risk category

15
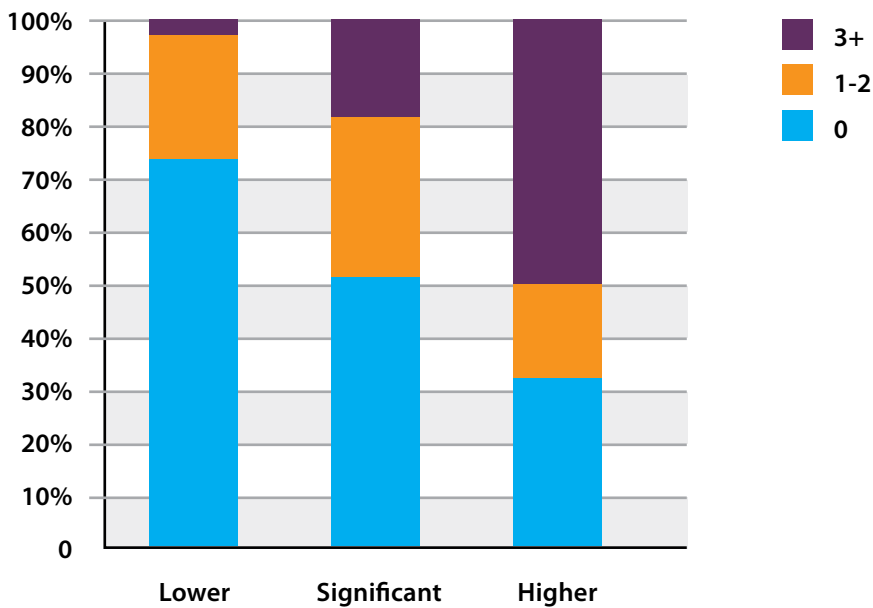
Table 9 indicates that many doctors are forced to skip meal breaks and that this problem is more pronounced for doctors working in the significant and higher risk categories. There was evidence in the 2006 audit that opportunities to have meal breaks had increased, but the figures below indicate that this trend has since been reversed, and the risks are very similar to those found in the 2001 audit.

TABLE 9 – Days without a meal break by risk category – seven day audit period

Risk category	Number of days		
	None	One or two	Three or more
Lower	47%	28%	25%
Significant	26%	25%	50%
Higher	21%	21%	58%

General Practice registrars

The AMA recognises that the risks of fatigue are not just an issue for doctors working in the hospital sector. For example, the AMA published a *Guide to Managing the Risks of Fatigue in General Practice*. This was designed to assist GPs and GP registrars.[27]

Only 87 GP registrars participated in the audit, which means the results should be treated with caution. However, it would appear that the risks of fatigue for GP registrars working in community settings are lower than most hospital-based doctors. Sixty two percent of respondents were classified as being at a lower risk of fatigue, which compares favourably to 47 per cent of hospital doctors.

It should be emphasised that the data do not show that GP registrars work substantially fewer hours than hospital-based doctors. The average of total hours worked in the 2011 audit week for all hospital doctors was 55.1 hours, whereas it was 52.4 hours for GP registrars. It would appear that the lower risks of fatigue for GP registrars is a product of different rostering arrangements in community settings, with the survey data showing that they do not appear to face the same extremes that are encountered when working in the hospital system. The following two tables illustrate this when compared with the results in Tables 5 and 6 on page 14.

27   Australian Medical Association. Managing the Risks of Fatigue in General Practice - For GPs and GP Registrars, 2008. http://ama.com.au/node/4193 (accessed Apr 2012).

TABLE 10 – Range of total hours worked by risk category – seven day audit period

Risk category	Range (hours)	Average hours
Lower	20-60	44
Significant	32-74	58
Higher	58-113	81

TABLE 11 – Longest continuous period of work by risk category – seven day audit period

Risk category	Range (hours)	Average hours
Lower	5-16	10
Significant	5-19	13
Higher	12-18	14

Due to the small sample size, the other data collected in relation to GP registrars are not discussed here. The AMA will explore how to better encourage the participation of GP registrars in future audits, which is seen as an essential area of further research for the AMA.

Conclusion

The results of the third AMA Safe Hours Audit indicate that, overall, there has been a reduction in the proportion of doctors whose working hours expose them to significant and higher risks of fatigue. However, the audit has revealed that many of the more extreme rostering practices still persist.

Various steps taken since the issue gained prominence in the mid-1990s appear to be achieving some success in curbing exposure of doctors to the risks of fatigue. Changing attitudues, an increase in the medical workforce, improved rostering practices and more informed industrial requirements are all likely to have contributed to this improvement. It is encouraging that progress is being achieved without the rigid restrictions that have been imposed in other countries.

Recent increases in graduate numbers are likely to have made a significant difference to the working hours of junior doctors, despite increasing demand for public hospital services. If these trends continue, monitoring the impact of this workforce growth on training opportunities will become increasingly important.

The consequences of unsafe rostering mean that further improvement is required. Reducing the risks of fatigue in a way that improves patient safety and the quality of services, without adversely affecting training quality, requires system-wide reforms that include improved staffing and dedicated patient handover arrangements.

The AMA hopes that further improvement of rostering practices is evident in future Safe Hours Audits.

Australian Medical Association Ltd
July 2012

NATIONAL CODE OF PRACTICE - HOURS OF WORK, SHIFTWORK AND ROSTERING FOR HOSPITAL DOCTORS

Summary

This is a voluntary Code that provides practical guidance on how to manage fatigue and eliminate or minimise the risks associated with shiftwork and extended working hours. It applies to all hospital employers and salaried hospital doctors and doctors in training.

"The AMA encourages all hospitals, doctors and doctors in training to become familiar with the Code, to review their rostering and working arrangements in the light of the risk assessment guidelines contained in it and to implement suitable changes to reduce their risk profiles."

FOREWORD

The AMA's National Code of Practice - Hours of Work, Shiftwork and Rostering for Hospital Doctors was issued in 1999 after a consultation process with stakeholders including all Australian hospitals, State health administrations, medical and regulatory organisations, doctors and a range of other bodies and individuals. It is available on the AMA website at https://ama.com.au/article/national-code-practice-hours-work-shiftwork-and-rostering-hospital-doctors .

The Code does not contain absolute, enforceable limits on single elements such as the maximum length of a safe shift or the break required between episodes of work. The level of fatigue and the consequent effect on safety and work performance is complicated and is the product of a range of factors.

Those factors are identified in the Code, which contains a Risk Assessment Guide and a Risk Assessment Checklist to help assess the risk level of an individual's working hours. The Code provides the tools to identify unsafe working hours and reduce the associated risk levels. The Code now stands as the accepted standard for safe working hours for hospital doctors and doctors in training in Australia and is referenced by standards organisations such as the Australian Council for Safety and Quality in Health Care, the Australian Council on Healthcare Standards, Postgraduate Medical Education Councils and the Australian Medical Council.

Based on the risk factors listed in the Code, the AMA developed a risk assessment methodology which measures the risk level of each situation against a risk rating scale. The AMA has used this tool to audit the work patterns of hospital doctors and doctors in training every five years since 2001. The results of these audits are available on the AMA website at https://ama.com.au/article/2011-ama-safe-hours-audit-9 .

This tool is also available on line to help doctors better understand their work practices and to determine whether they are at risk of fatigue. The AMA Fatigue Risk Assessment Tool is available at http://safehours.ama.com.au/ . Doctors who use the tool will receive an on-line assessment of the fatigue risks of their roster. Doctors who are assessed as being at risk are encouraged to raise this with their hospital management and AMA members can also contact their local AMA branch for assistance.

Other useful AMA resources include the AMA guidance on clinical handover – Safe Handover: Safe Patients https://ama.com.au/sites/default/files/documents/Clinical_Handover_0.pdf – to assist doctors, hospitals and members of the healthcare team in their efforts to improve patient safety.

The AMA encourages all hospitals, doctors and doctors in training to become familiar with the Code, to review their rostering and working arrangements in the light of the risk assessment guidelines contained in it and to implement suitable changes to reduce their risk profiles.

FEEDBACK

Feedback is welcome and can be directed to:

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Further information on doctors' health and wellbeing and fatigue management can be found on the AMA website at https://ama.com.au/resources/doctors-health

Australian Medical Association Ltd

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ABOUT THE CODE

The AMA's National Code of Practice - Hours of Work, Shiftwork and Rostering for Hospital Doctors (the Code) responds to ongoing concerns about working hours and safe practice. It acknowledges the special characteristics of the hospital sector as well as managing the risks associated with shiftwork and extended hours for hospital doctors and doctors in training.

Since the AMA embarked on its safe working hours campaign in the mid-1990s there has been a significant reduction in the number of doctors whose working hours expose them to higher risks of fatigue.[1] The trend towards reduced working hours for doctors is confirmed by the latest Australian Institute of Health and Welfare and Medicine in Australia: Balancing Employment and Lifestyle (MABEL) survey data.[2,3]

Along with changing attitudes to the ethic of safe hours, increasing numbers of prevocational and vocational trainees, and a growing emphasis on efficiency within the hospital sector, the Code has been instrumental in shifting workplace practice without the need for the rigid restrictions on working hours that have been introduced in Europe and the United States.[4] However extremes in hospital doctor working hours still persist and many hospital doctors continue to work rosters that place them in higher risk categories.

As the evidence regarding doctor fatigue and patient safety matures, achieving safe working hours will require intelligent solutions beyond a simple restriction in working hours. The Code is one part of a broader education and awareness program to improve understanding about the risks fatigue creates for individual health and safety and quality of patient care. It also promotes change in individual and organisational practice, beliefs and culture to support safer working hours and patterns for hospital doctors and doctors in training.

The Code has also been prepared in recognition of the responsibilities of employers and employees under Work Health and Safety (WHS) legislation. A list of Australian WHS legislation is at Appendix A. In this legislative framework a safe system of work needs to be provided to protect employees and others (including patients) affected by the employers' activities. This is in contrast to the individual liability model, more commonly associated with incidents involving patient treatment.

A detailed literature review outlining the background to the Code can be found at Appendix B.

1.1   PURPOSE

This Code provides practical guidance on how to manage fatigue and eliminate or minimise the risks associated with shiftwork and extended working hours.

1.2   SCOPE

This Code applies to all hospital employers and salaried hospital doctors and doctors in training.

The scope of the Code is limited to hazards related to shiftwork and extended working hours and the effect on the health and safety of individual doctors and impacts on patient care.

Other hazards present in a hospital environment are not covered in this code and reference should be made to other legislation, standards, codes and guidance material in relation to those hazards.

1.3   STATUS OF THE CODE

This Code is a voluntary code developed to be compatible and consistent with WHS legislation in Australian States and Territories.

A voluntary code does not have any specific legislative standing but provides recommendations for duty holders to consider in meeting their obligations. A distinction needs to be drawn between a Voluntary Code and an Approved Code of Practice that is made under relevant State and Territory legislation.

An Approved Code of Practice[5] supports either general duties in a WHS Act or specific duties in a regulation. To have legal effect in a jurisdiction, a model Code of Practice must be approved as a code of practice in that jurisdiction. Compliance with guidance provided in an approved code is not mandatory but duty holders should follow such a guide unless they have an alternative method that achieves the same safety outcome. An approved code has evidentiary status and may be used in a prosecution to demonstrate a failure to meet a duty.

A Voluntary Code, such as this national code, does not necessarily have evidentiary status but may have some legal status like all other guidance in that it contributes to "the state of knowledge" about a particular hazard or risk and the ways of mitigating that hazard or risk, particularly if its use is clearly encouraged in a workplace.

1.4   LEGISLATIVE FRAMEWORK

This Code operates in the context of WHS legislation that sets out a general duty of care for employers to provide and maintain a safe and healthy workplace. Legislation in most states and territories follows this formulation with the duty of care qualified by an expression such as "so far as is practicable".

"Practicable" means that the duty to provide and maintain a safe and healthy workplace is qualified by:

- The cost of removing or mitigating a hazard or risk.
- The state of knowledge about the hazard or risk.
- The state of knowledge about measures to control risks.
- The severity of the hazard or risk.

Consequently, this Code provides guidance on practicability in relationship to the hazards and risks associated with extended working hours.

Modern WHS law is described as performance based, highlighting the achievement of safety outcomes rather than defining in great detail the way in which the outcome is to be achieved. This code is drafted within this framework to enable flexibility and innovation in managing risks. Since 2012, WHS legislation in Australia has been harmonized by adoption in most jurisdictions of the model *Work Health and Safety Act*. This has not been adopted in all jurisdictions. (See Appendix A for legislative references).

Each state and territory is responsible for regulating and enforcing WHS laws. WHS legislation includes a model WHS Act, regulations, Codes of Practice and a national compliance and enforcement policy

1.5   GENERAL DUTIES IN MORE DETAIL

Primary duty

Under the WHS legislation adopted in most states and territories, the primary duty of a person conducting a business or undertaking is to ensure as far as is reasonably practicable:

a) the provision and maintenance of a work environment without risks to health and safety, and

b) the provision and maintenance of safe plant and structures, and

c) the provision and maintenance of safe systems of work, and

d) the safe use, handling, and storage of plant, structures and substances, and

e) the provision of adequate facilities for the welfare at work of workers in carrying out work for the business or undertaking, including ensuring access to those facilities, and

f) the provision of any information, training, instruction or supervision that is necessary to protect all persons from risks to their health and safety arising from work carried out as part of the conduct of the business or undertaking, and

g) that the health of workers and the conditions at the workplace are monitored for the purpose of preventing illness or injury of workers arising from the conduct of the business or undertaking.

A 'worker' includes:

- an employee, or
- a contractor or subcontractor, or
- an employee of a contractor or subcontractor, or
- an employee of a labour hire company
- an outworker, or
- an apprentice or trainee, or
- a student gaining work experience, or
- a volunteer.

A primary duty of care exists when you:

- direct or influence work carried out by a worker,
- engage (or cause to engage) a worker to carry out work (including through subcontracting),
- have management or control of a workplace.

WHS Duties of workers

While at work, a worker must:

a) take reasonable care for his or her own health and safety, and

b) take reasonable care that his or her acts or omissions do not adversely affect the health and safety of other persons, and

c) comply, so far as the worker is reasonably able, with any reasonable instruction that is given by the person conducting the business or undertaking to allow the person to comply with this Act, and

d) co-operate with any reasonable policy or procedure of the person conducting the business or undertaking relating to health or safety at the workplace that has been notified to workers.

Even more broadly, a person conducting a business or undertaking must ensure, so far as is reasonably practicable, that the health and safety of other persons is not put at risk from work carried out as part of the conduct of the business or undertaking. This could potentially extend to the safety of patients in a medical context.

1.6 RELATIONSHIP OF THE CODE TO AWARD AND AGREEMENT PROVISIONS

Much has changed in Australia since the National Code of Practice was first launched in 1999. In addition to specific industrial relations provisions regulating hours of work and rostering practices, industrial agreements in most jurisdictions increasingly acknowledge the importance of managing fatigue in the workplace.

While these changes are for the most part positive, a complex interplay between efficiency, personal choice, safety and quality, and the industrial rights of employers/employees in relation will continue to create professional and industrial questions for doctors and employers.

The minimum standards vary from jurisdiction to jurisdiction but nothing in the Code should be read as altering these minimums. Award and Industrial Agreement provisions primarily relate to pay and penalty rates, whereas the code provides guidance on how to manage the risks arising from shiftwork and extended hours.

HAZARD IDENTIFICATION, RISK ASSESSMENT AND RISK CONTROL

The primary WHS legislation requires risks to be controlled. A duty imposed on a person to ensure health and safety requires the person:

a) to eliminate risks to health and safety, so far as is reasonably practicable, and

b) if it is not reasonably practicable to eliminate risks to health and safety, to minimise those risks so far as is reasonably practicable.

What is 'reasonably practicable' in ensuring health and safety?

Under the model WHS legislation, 'reasonably practicable', in relation to a duty to ensure health and safety, means that which is, or was at a particular time, reasonably able to be done in relation to ensuring health and safety, taking into account and weighing up all relevant matters including:

a) the likelihood of the hazard or the risk concerned occurring, and

b) the degree of harm that might result from the hazard or the risk, and

c) what the person concerned knows, or ought reasonably to know, about:

    a. the hazard or the risk, and

    b. ways of eliminating or minimising the risk, and

d) the availability and suitability of ways to eliminate or minimise the risk, and

e) after assessing the extent of the risk and the available ways of eliminating or minimising the risk, the cost associated with available ways of eliminating or minimising the risk, including whether the cost is grossly disproportionate to the risk.

The method of assessing risks will vary according to the nature of hazards and the industry in which they are found. For example, in chemical processing industries complex quantitative risk assessment methods may be used because of the potential severity of failures and the high levels of interdependence of hazards. Conversely, a small domestic building site may use simple observational methods to identify hazards and assess risks.

Risk controls are normally seen in terms of a hierarchy of control ranging from "hardware" controls like engineering or design, through substitution and isolation, to "software" controls like training, administrative measures and personal protective equipment.

In order to be consistent with the philosophy and approach of current WHS law and Approved Codes of Practice, the hazard identification, risk assessment and risk control model is used in this code.

2.1   HAZARD IDENTIFICATION

The employer should ensure that all hazards associated with shiftwork and extended working hours in a hospital are identified. A hazardous agent or process is one which has the potential to cause harm. Hazard identification should be undertaken as part of the business planning process of the hospital and be regularly reviewed in light of changing circumstances.

Information on hazards can be collected from:

- Daily, weekly, monthly and annual working time records.
- Workers compensation, absence and sick leave records.
- Incident and injury records associated with extended working hours.
- Views of doctors collected through hospital surveys, complaints or disputes involving extended working hours.
- Health surveillance records.
- Reports or advice from specialists in work scheduling, shiftwork and fatigue.
- Research findings into the impact of extended hours on work performance and health and safety.

This hazard identification phase needs the active involvement of doctors through consultative arrangements like WHS Committees or other hospital based forums. It is also important to acknowledge that working hours, schedules and workloads will impact on individuals differently. For a given hazard some doctors will respond differently and some may be at greater risk of harm than others. Hospitals should interpret hazards in the context of the doctor and the situation concerned, and consultation and planning with individual doctors as to how to mitigate professional, personal and organisational risk is a key part of hazard identification and risk control.

2.2   TYPICAL HAZARDS ASSOCIATED WITH SHIFTWORK AND EXTENDED HOURS
Common hazards associated with extended hours revolve around work scheduling, the relationship to circadian rhythms and other scheduling and organisational factors that exacerbate these situations. [6]

2.2.1   Excessive Consecutive Hours Worked in Any One Period
The number of hours normally worked in shift or "ordinary" hours is set out in various industrial agreements, however, these ordinary hours may be extended through overtime and "call back" arrangements to deal with heavy workloads.

Working long hours in any one period (usually beyond 10 hours) may have a number of effects:

- Where extended hours are part of a rotating shift, further disruption to circadian rhythms may result.
- Lack of sleep and fatigue.
- Reduced work performance particularly in the early hours of the morning.

2.2.2   Lack of Rest Within and Between Work Periods
Within a period of extended hours, breaks should be taken where practicable, to enable recovery from intensive periods of concentration and physical work.

Lack of suitable rest periods between periods of work presents a significant hazard.

Lack of opportunity for undisturbed continuous sleep because of excessive hours worked including on call periods and the maintenance of the rostered work schedule may lead to chronic fatigue and sleepiness sometimes referred to as sleep debt. This is especially a concern for those working rotating shifts or permanent night shifts or for those whose extended hours take them into the night shift period.

2.2.3   Inappropriate Speed and Direction of Shift Rotations
The disruptions to sleep, personal and social life and the onset of fatigue are related to the difficulty the human body has adapting to changing work routines. Permanent night shift workers may get used to their work tasks but research suggests they never really adapt, as many return to a normal day schedule on their day off. This is to maintain their social life with family and friends. In this situation body rhythms never completely adapt to night work and cumulative sleep debt and fatigue can reach levels at which safe performance of duties is compromised.

In this sense there is less difference between permanent and rotating shifts than is normally assumed.

The direction of the shift rotation refers to the order of shift changes:

- A forward or clockwise rotation is for day (normally 8 am through to 5 pm) to evening (normally 4 pm through to 11 pm) to night (normally 11 pm through to 8 am).
- A backward or anti-clockwise rotation is from day to night to evening shift.

The rotation direction likely to optimise health and safety will vary according to body rhythms.

It is generally accepted that a forward rotation is more beneficial than a backward rotation. This is because it is easier to go to bed later and wake up later than to have to go to sleep earlier and earlier as required in a backward rotation. The speed of rotation is the number of days an individual spends on a particular shift before a change occurs to another shift or to time off periods.

A slowly rotating schedule, working for example 3 to 4 weeks on the same shift, appears to allow greater time for body rhythms to adjust and adapt. However, as the quality of day sleep is lower, such long cycles may create an accumulating sleep debt and fatigue problem. This can be exacerbated because workers usually return to a day schedule on their days off to fit in with family and social life.

A fast rotation, every two days for example, may enable the worker to maintain normal circadian rhythms, as body functions do not have time to start adjusting to night shifts.

Such rapid rotations also allow individuals to get through difficult shifts and not allow sleep debt to accumulate. The disadvantage is that while on night shifts individuals will be out of balance with natural body clock rhythms.

2.2.4   Irregular and Unpredictable Work Schedules

Whatever the individual experience of different shift speed and rotations, it is more favourable to have a regular and predictable work scheduling arrangement. One of the areas in which shifts and extended hours impacts most is on family and social life and predictability of scheduling minimises the potential social dislocation. Unpredictability of work scheduling also compromises the quality of rest time if there is the continual possibility of recall to duty.

Consequently, on-call arrangements both on-site and off-site also need to be structured in accordance with the issues considered under hazards already outlined.

Where rostering or on-call arrangements provide for doctors to remain on the hospital campus on-site facilities should maximise the opportunity for undisturbed rest and sleep. Where recall to duty is involved, particular attention should be given to the individual's current and recent work pattern in order to minimise hazards created by disruption of body rhythms and the potential for reduced work performance.

Hospitals should have mechanisms for compensating doctors who are not able to continue with their clinical duties due to an unexpectedly demanding or extended period of work. There should be flexibility within the hospital system to allow stressed and/or fatigued doctors to be relieved.[7]

2.2.5   Night Shift or Extended Hours that Lead into Night Shift

The combined effects of sleep deprivation and disruption to the body's internal clock come together after an individual works a night shift or where prolonged hours stretch into the night shift.

Circadian rhythms can cause performance levels to vary and many aspects of human performance are at their lowest level at night with 2am to 6am recognised as a low alertness period.

This is overlaid by lack of sleep caused by the reduced length of day sleep between consecutive night shifts.

Working on a night shift, whether it is one off or as part of an ongoing roster, represents a hazard for doctors working extended hours. Doctors who are rostered on regular night shifts are also less able to be involved in educational activities and continuing professional development from senior staff and hospital departments. In addition to the individual hazard from extended hours, there is also an institutional hazard from doctors being excluded from ongoing educational activities.

Hospitals should allow for periods of rest during night shifts to mitigate fatigue, especially during periods of low alertness. This could be achieved by providing on call rooms on site for doctors and other health professionals on night shift to rest if there is no requirement to be awake for clinical activities.

2.2.6   Type of Work and Additional Workloads

There is research that indicates particular types of tasks are performed better at particular times of the day than others. For example, tasks involving simple monitoring of activity improve over the day but are poorer at night.

Performance reductions with particular types of tasks can be modified by factors like the length of time involved doing them and the intrinsically interesting or satisfying nature of the work. For doctors this means that performance may be maintained over longer periods for complex tasks but simpler, routine medical or administrative tasks may not be completed to a satisfactory level.

Where this situation is compounded by the demands of education and training at peak periods in the working year, this hazard is greater. Study demands that eat into normal rest periods represent a particular concern for trainee doctors as the possibility of sleep deprivation and fatigue increases. Secondly, the effectiveness of the actual learning and education process is reduced.

2.2.7   Potential Exposure to Other Hazards

Exposure levels and thresholds for hazards like chemicals are usually calculated on a normal 8 hour working day basis. Extended hours of work and exposure need to be considered in assessing the risks associated with these kinds of hazards.

2.3   RISK ASSESSMENT

The employer should undertake a risk assessment to determine if there is any risk associated with the hazards identified.

A risk is the likelihood of injury or illness arising from any exposure to a hazard. Risk assessment is a process to determine the likelihood and impact of injury or illness for those exposed to the hazard. The risk assessment should consider any controls or methods already being used to control risk and assess the effectiveness of such current methods.

Risk assessment methods should be identified that are appropriate for the hazards identified and may include:

- Use of specialist expertise in scheduling and shiftwork.
- Use of techniques that enable calculation of potential sleep deprivation and fatigue risk factors.
- Consultation with staff on "best fit" schedules and on individual orientations to different work schedules.
- Use of available research on shiftwork, and extended hours and fatigue management.
- Consideration of alternative learning environments, including simulation techniques.

A risk assessment checklist and guide is set out below to assist in the assessment process and the recommended standards should form the basis of any work scheduling for doctors. Where these standards are not practicable, the employer should institute actions to minimise the impact of any individual hazard or the cumulative effect of related hazards.

2.3.1   Risk Assessment Checklist and Guide

The hazards associated with shiftwork and extended hours are complex and interrelated. In addition, individuals have different circadian rhythms that affect their performance at different times of the day.

Consequently, the risk assessment process needs to not only consider risks arising from schedules but also involve close consultation with doctors in order to achieve the best result.

The following checklist includes a number of defined operating standards and thresholds at which action should be triggered. Where these minimum standards are not being met a higher risk exposure is possible and consideration needs to be given to ways in which hazards can be eliminated or individual elements can be counter-balanced by other compensating aspects.

The checklist is in the form of questions to which an affirmative response would indicate risk controls need to be considered.

In using this checklist, administrators and staff should assess the risks associated with identified hazards.

The hazards and their associated risks are interrelated and in many cases cumulative. The traditional risk assessment model of frequency, severity and probability of occurrence is difficult to apply with

these hazards but the following guidelines drawn from the checklist illustrate a risk continuum from lower, to significant, to higher.

The Guide is not intended to be exhaustive but rather a tool in the assessment of risks. Other factors that need to be considered include:

- Lifecycle (e.g. age or family commitments).
- The intensity and nature of work (e.g. high concentration tasks, physically demanding tasks or decision making tasks).
- Work environment (e.g. appropriate light sources and ventilation).
- Incidence of sleep disorders, including shiftwork related insomnia.
- Capacity to meet training requirements.
- Service delivery and patient safety.

It should be noted in the Guide that hours worked refers to all hours whether rostered or not. Similarly overtime refers to all overtime worked whether rostered or unrostered.

The following risk assessment checklist and guide can be used to help determine the fatigue risks of a roster and can inform safe rostering practices.

RISK ASSESSMENT CHECKLIST

1	Are doctors regularly scheduled to work more than 10-hour shifts?
2	Do doctors work through a full shift cycle (i.e. 24 hours or more) at least once in a 7-day period?
3	Do doctors work more than 14 consecutive hours in any one period (including overtime and recalls) at least twice a week?
4	Is the minimum period of rest between scheduled work less than 10 hours?
5	Are the total hours worked • in a 7-day period more than 70 hours (including overtime and recalls)? • in a 14-day period more than 140 hours? • in a 28-day period more than 280 hours?
6	Is the minimum non-work time • in a 7-day period less than 88 hours? • in a 14-day period less than 176 hours? • in a 28-day period less than 352 hours?
7	Is there less than a 24-hour break free of work in a 7-day period?
8	Are there less than two 24-hour breaks free from work in a 14-day period?
9	Are there less than eight 24-hour periods free from work in a 28-day period?
10	Are doctors rostered for on-call duty more than once every three days?
11	Does the shift rotation move anti-clockwise?
12	Does the shift rotation change direction and speed over a 28-day period?
13	Have the actual hours worked and the times at which they have been worked in the last 28 days varied from the posted roster by more than 25%?
14	Is a doctor scheduled for more than three night shifts in a 7-day period?
15	Is a doctor rostered for on-call duty comprising more than 24 hours of the minimum 88 hours free from work in a 7-day period?
16	Is a doctor's work roster and schedule making it difficult for them to fulfil educational and training requirements?

RISK ASSESSMENT GUIDE (based on a 7 day period)

*Lower Risk (1 point)	* Significant Risk (2 points)	*Higher Risk (3 points)
Less than 50 hours worked	50 to 70 hours worked	More than 70 hours worked
No more than 10 consecutive hours in any one period	Up to 14 consecutive hours in any one period	14 or more consecutive hours worked at least twice
Scheduled shift hours worked	Scheduled shift plus part of next shift worked	A full shift cycle worked of at least 24 hours
Three or more short breaks taken during shift	One or two short breaks taken during shift	No short breaks taken during shift
Little or no overtime	More than 10 hours overtime	More than 20 hours overtime
Rostered for on-call less than 3 days in 7 days	Rostered for on-call duty 3 days or more in a 7-day period	Rostered on-call continuously for more than a 7-day period
No night shift or extended hours into night shift	At least 2 night shifts or extended hours into night shift	At least 3 night shifts or extended hours into night shift
Minimum 10 hour breaks between work periods and 2 days free of work	Minimum 10 hour breaks between work periods and 1 day free of work	Less than minimum 10 hour break on at least two work periods and no full day free of work
Forward shift rotation and predictable cycle	Forward shift rotation but changed cycle	No stable direction or speed of rotation
No changes to roster without notice	Changes to roster through overtime and recalls worked	Roster changed so much because of overtime and recalls so as to be unpredictable
Maximum opportunity for sleep to be taken at night including two full nights of sleep	About two-thirds of sleep able to be taken at night including one full night of sleep	Less than half of sleep able to be taken at night and no opportunity for one full night of sleep

*Each Lower Risk Element to be scored at 1

*Each Significant Risk Element to be scored at 2

*Each Higher Risk Element to be scored at 3

The Guide is based on a 7-day cycle but as the hazards of shiftwork and extended hours are cumulative this model should be applied to a 14-day period and a 28-day period as the items in the higher risk column create a greater risk the longer they are present. For example, if less than half of any sleep is able to be taken at night over a long period then the effects of sleep deprivation may be evident in work performance and on individual health.

A simple scoring system may assist in assessing risks for doctors. Lower Risk Elements are worth 1 point, Significant Risk 2 points and Higher Risk 3 points and when a Significant or Higher Risk Element is present for consecutive 7-day periods the points should be doubled on a rolling basis and then returned to normal points when the cycle is broken.

For example, a doctor who worked more than 70 hours a week for 4 weeks would be scored at 24 points in the final week. Conversely, if the 70-hour week was a one off then the score at the end of the 4-week period would be between 6-9 points.

Another example would be where at least two night shifts are worked in a week but breaks are taken within shifts, the minimum break between shifts is maintained and the shift cycle is predictable. In this case a potential high risk is balanced by other measures and the overall profile may be kept at the lower risk end of the scale.

The purpose of scoring is to provide a crude but simple way of highlighting risks to doctors, to the hospital and to those dependent on both. The profile can be adjusted to add specific risk factors relevant to the type of hospital and used to establish a preferred profile that meets patient and doctor needs as well as obligations to provide and maintain a safe and healthy workplace.

2.4 RISK CONTROL

Under WHS legislation an employers' duty is to control risk by either eliminating the hazard or by minimising the risk associated with the hazard.

As hours of work are an administrative or organisational matter the controls must be applied at a lower level of what is normally called the hierarchy of control. At the top of the hierarchy are controls that do not rely on human action (e.g. design, engineering), through to those that are dependent on individual and organisational measures (e.g. training, scheduling and personal protective equipment).

The effectiveness of controls at the level of individual and organisation is dependent on shared ownership of the protocols and arrangements to control risks.

Risk controls for shiftwork and extended hours cannot be set out as a series of stand alone solutions that will be effective in all cases. A series of strategies should be used including:

a) Design Principles for Schedules
b) Information, Supervision, Consultation & Training
c) Facilities and Services
d) Monitoring and Review

2.4.1 Design Principles for Schedules

Scheduling the work of doctors in hospitals to eliminate or minimise the risks to their health and safety and to those affected by their actions is the key control measure. The following performance based principles should underline the design of work schedules, which should be designed to:

- Minimise the occasions on which doctors are required to work more than 10 hours in a period.

- Ensure that minimum breaks between shifts enable doctors a minimum 8 hours continuous sleep before resuming duty. This should account for travel time from various rotations either to home (i.e. try to rotate doctors closer to home) or from the primary site (i.e. to which workers are more likely to live).

- Use a forward shift rotation to minimise individual adaptation problems.

- Avoid rapid shift changes such that at least a 24 hour break is provided before rotating to a new shift.

- Ensure doctors have regular time (a minimum of 24 hours) free of work in a 7-day period in which unrestricted sleep is possible.

- Minimise consecutive night shifts in order to limit reductions in performance levels caused by circadian rhythm imbalances.

- Ensure that longer breaks between and following night shift are provided.

- Account for 'covering' contingencies caused by sickness or absences by ensuring adequate staffing and support and using locums as required.

- Maximise the opportunity to take breaks within shifts.

  - Allocating sufficient time during the week to allow for:

  - Effective handover (refer to AMA guidance on clinical handover – Safe Handover: Safe Patients
    https://ama.com.au/sites/default/files/documents/Clinical_Handover_0.pdf

  - Audit and peer review

  - Education, training and research

  - Recreational leave

In some cases these design principles will not accord with current practices, and hospitals should ensure that any risks are appropriately managed. For example, permanent night shift arrangements for specific doctors may achieve the outcome of minimising night shift for others. Similarly, long cycle night shifts with long breaks following may be used to provide predictability in work scheduling and mitigate risk

Other risk control strategies that should be used in managing workloads include:

- Where practicable, complex tasks should be scheduled during the day and routine and administrative tasks should be minimised or redesigned to ensure doctors can focus on core duties in their working time.
- Undertaking complex tasks early in the shift where practicable.
- The allocation of staff numbers to peak times and demands is a fundamental factor in minimising the exposure to risks associated with extended working hours. Numbers and types of doctors should be rostered on the basis of predictable demands for services by daily, weekly, seasonal and annual trends.
- Replacing or substituting rostered doctors where extended hours have created a risk to doctor health and safety and patient welfare.
- Deferring non-urgent work to allow appropriate rest and recuperation for doctors.

2.4.2 Information, Supervision, Consultation and Training

Information

Doctors should be provided with information on shiftwork, extended hours and fatigue management including information on:

- The hazards associated with shiftwork and extended hours.
- Potential health and safety impacts of shiftwork and extended hours.
- Duties under the WHS legislation of employers and employees.
- How to identify problems associated with lack of sleep and fatigue.
- Individual strategies to best manage shiftwork, extended hours fatigue.
- Sleep disorders, sleep hygiene and non-pharmacological approaches to insomnia.
- Services available to assist doctors to cope with the effects of shiftwork, extended hours and fatigue on health and/or quality of life.

- The hospital system for reporting incidents related to shiftwork and extended hours including mechanisms for doctors to report problems they experience in relation to excess hours, fatigue and sleep deprivation.

Supervision

Supervision ensures that tasks are performed safely and work instructions and procedures are adhered to. Supervision should be commensurate with the complexity of tasks to be undertaken and enable prompt action to be taken to maintain health and safety standards.

Access to specialist clinical support should be available especially during night shifts.

Supervisors should be aware of shiftwork and extended hours related hazards and take action within their allocated responsibility to eliminate or minimise hazards. Supervising doctors and hospital administrators must be trained to identify trainees who are working excessive hours and/or are having difficulties in fulfilling their work commitments, and to assist in finding and negotiating solutions and alternatives and support services as necessary.[8]

Consultation

The obligation to consult with employees is an employer duty set out in WHS Acts and Regulations and is part of the process for providing a safe and healthy workplace. Consultation with employees and their representatives, WHS representatives, and WHS Committees is relevant to achieving effective outcomes.

In the case of working hours, consultation is a key part of risk control as schedules and workloads will impact on individuals differently.

Consequently, an important part of developing effective controls through work scheduling and task allocation is consultation with those working shifts and with potential exposure to risk.

Doctors should be involved in the development of rosters having regard to the design principles set out above. They should also be involved in decisions to vary schedules from these design principles.

Individual differences in rhythm characteristics (morning/evening) may mean some are better suited to scheduling at specific periods in a shift cycle. These characteristics may not be as important as broader work/life balance issues but reinforces the need for active staff involvement in work scheduling.

If work scheduling is a managerial task with little staff input then both the regularity and predictability of the roster will decrease as ad hoc adjustments are continually made to address individual circumstances.

Training

Hospital employers should ensure that doctors are provided with appropriate training to minimise the risks associated with extended hours and shiftwork, and to be aware of when safe working hours' limits are being reached in their own practice.

An induction program should include reference to the following:

- Duties of employers and employees.
- Circadian rhythms and their relationship to work scheduling.
- Shiftwork schedules and design principles.
- Hazards associated with shiftwork and extended hours.
- Health and safety impacts of shiftwork and extended hours.
- Incident reporting.
- Individual strategies for coping with shiftwork and extended hours.

Providing appropriate training is essential to risk control by:

a) Enabling informed input to work scheduling.
b) Enabling critical self assessment in terms of readiness for duty.
c) Understanding and recognising sleep debt and fatigue circumstances.

Trainees

Trainees usually have a more formalised working schedule, set out by hospitals, in relation to overtime shifts and daily working hours. The number of working hours for which a trainee is rostered will depend on whether the work occurs mainly during the day or at night. They are also required to fulfil the minimum training requirements of the education and training program they are enrolled in, and hospitals must recognise this requirement and facilitate completion of the training programme. As such, close negotiation between the hospital and training provider is required to ensure that both employment and training obligations can be fulfilled within the context of a working environment that is safe for the patients, the trainees, and their colleagues.[9]

2.4.3   Facilities and Services

An essential control strategy is to provide suitable facilities in which doctors can have short or extended breaks during shifts or short naps within long shifts.

Hospitals should provide:

- Rest areas in which doctors can take short breaks from duty.
- Locker rooms and showers.
- Suitable facilities for doctors where required on the hospital campus to enable a minimum of 8 hours undisturbed sleep between shifts or to have short naps within long shifts.
- Access to suitable catering facilities providing nutritional food and beverages consistent with diet guidelines that maximise the ability to work shifts and extended hours.
- Access to counselling services to assist in any issues arising from the disruption to individual, family or social patterns caused by shifts or extended hours.
- Access to advice on diet and physical fitness.

2.4.4   Monitoring and Review

By the nature of work scheduling and unanticipated workloads in hospitals the system of risk controls needs constant monitoring and review.

The process of monitoring should be done on a single shift basis, over 7, 14 and 28-day periods to establish potential risk exposures and to actively manage known risks in the upcoming period.

Real time monitoring is especially important in known risk periods such as between 2 am and 6 am where body temperature is at its lowest. Similarly risks related to commuting after long shifts have been worked is a matter for both employer and doctor to monitor closely.

Where it is not practicable to keep working hours within the lower risk levels (less than 50 hours per week) then close monitoring of the related risk factors needs to be undertaken.

The schedule of actual hours worked should be reviewed at least every month to identify opportunities to reduce or eliminate risks. This review should involve doctors or their representatives.

The review process should include an examination of any incidents related to doctor or patient welfare that may have been associated with hazards arising from shifts or extended hours. Secondly, the review should draw on longer-term incident reporting to determine any trends requiring preventative action.

In addition health surveillance to monitor doctor's health in relation to established health effects of shiftwork and extended hours is recommended.

2.5   INCIDENT REPORTING AND INVESTIGATION

A required element of a safe system of work is reporting of incidents that either caused injury, or had the potential to do so. Comprehensive and thorough reporting enables corrective action to be taken and allows better prevention planning to take place.

Depending on the nature of the incident regulatory agencies require the reporting of incidents involving death, injury and dangerous occurrences.

The hospital should establish policies and procedures that:

- Define the kinds of incidents that should be reported.
- Encourage staff to report incidents.
- Enable incidents to be recorded and analysed for underlying causes.
- Ensure incidents are investigated and any required corrective action is taken.
- Make information available for the review process outlined in 2.4.4.

2.6   RECORD KEEPING

Most WHS regulation requires records of risk assessments to be kept and to be available to the regulatory authority on request.

Hospitals should keep a record of risk assessments conducted either in a generic sense to apply to all work scheduling or to document how alternative ways of managing specific risks were established.

Risk assessment records should also be available to employees on request.

Keeping records of training provided to doctors is also recommended.

Other record keeping flows from the incident and injury reporting mechanisms referred to in 2.5 and hospitals are already required to keep injury and incident records under relevant WHS, Dangerous Goods and Workers Compensation legislation.

EMPLOYEE DUTIES

As noted earlier in the code, whilst employers have the primary duty of care, there is an employee duty to assist the employer in meeting health and safety obligations and to take reasonable care not to put themselves, or others, at risk.

Translating this duty to shiftwork and extended hours an employee would be expected to:

- Participate in training provided to gain an understanding of the hazards of shiftwork and extended hours.
- Ensure that breaks provided within and between shifts are used for rest and recuperation.
- Report incidents arising from hazards related to shiftwork and extended hours.
- Recognise signs of sleep deprivation or fatigue and the impact on themselves and others, and take active steps to avoid the impact on themselves and others.
- Report to supervisors on circumstances in which fatigue and lack of sleep is impacting on individual well being and patient care.
- Consider the implications of voluntarily seeking additional hours, both at the hospital and elsewhere, that may increase risks to health and safety and patient care.

It is recommended that hospitals develop with doctors and their representatives a policy on work readiness covering such matters as drugs and alcohol, extracurricular commitments including other jobs and education and training commitments.

USEFUL RESOURCES

Some useful sources for more information include:

- AMA Guide Guidance on clinical handover: Safe Handover: Safe Patients 2007. https://ama.com.au/article/guidance-clinical-handover
- Australian Commission on Safety and Quality in Health Care, in particular the Safe Staffing and Patient Safety Literature Review, 2012 http://www.safetyandquality.gov.au/former-publications/safe-staffing-and-patient-safety-literature-review-pdf-673-kb/
- The Centre For Sleep Research, University of Adelaide, South Australia http://www.unisa.edu.au/research/centre-for-sleep-research/
- National Institute for Occupational Safety and Health, Atlanta, Georgia, USA http://www.cdc.gov/niosh/
- Safe Work Australia http://www.safeworkaustralia.gov.au/sites/swa/about/publications/pages/sr200908impactofshiftwork

APPENDIX A - LEGISLATIVE REFERENCES

The following Acts contain the general duties that are referred to in Sections 1.4 and 1.5 of the Code.

Victoria	Occupational Health and Safety Act 2004
New South Wales	Work Health and Safety Act 2011
South Australia	Work Health and Safety Act 2012
Tasmania	Work Health and Safety Act 2012
Queensland	Work Health and Safety Act 2011
Western Australia	Occupational Safety and Health Act 1984
Commonwealth	Work Health and Safety Act 2011
	Employment) Act 1991
Australian Capital Territory	Work Health and Safety Act 2011
Northern Territory	Work Health and Safety (National Uniform Legislation) Act

APPENDIX B – BACKGROUND TO THE CODE

B.1   SHIFTWORK AND EXTENDED HOURS

There is a tradition of onerous working hours in the medical profession. It has been expected that doctors will be able to sustain the highest professional standards despite working extended shifts and demanding on-call rosters.

In the past, some in the profession believed that rigorous training systems for doctors ensured that they could continue to function effectively through 24-hour shifts, continuous on-call rosters, little sleep, and short breaks between episodes of work.

Shift work is associated with adverse health, safety and performance outcomes. Circadian rhythm misalignment, inadequate and poor sleep quality and sleep disorders contribute to these associations.[10]

Until relatively recently, little effort has been made to study the effects of arduous work schedules on the wellbeing of doctors or the patients in their care. There is now a bank of evidence that links the effects of sleep deprivation and fatigue to a greater risk of human error and harm to both patients and doctors. [11]

More recently, systematic reviews of overseas measures to regulate work hours have been published, and the impact of these on safety and quality of care as well as medical education and training is the focus of international debate.[12,13,14,15] The challenge in the Australian context is how to balance this with the demands of training and service delivery in an environment where long working hours are no longer synonymous with professionalism and a growing emphasis on achieving a healthy work life balance.

B.2   QUALITY OF LIFE, SLEEP AND FATIGUE

B.2.1   The Body Clock

In a hospital setting doctors frequently work shifts or extended hours that mean they are working when they normally would be sleeping and sleeping when they would normally be working. Circadian rhythms, which repeat approximately every 24 hours, are associated with many human functions including body temperature, hormone production and sleep and wakefulness.

Work schedules where people are expected to be awake and active at an inappropriate time in the cycle causes disruption of circadian rhythms. In addition environmental cues (like light and dark) that keep an individual's cycles on track are out of coordination.

These disruptions impact on the quantity and quality of sleep, impact on task performance and also create a sense of personal dislocation and imbalance.

B.2.2   Sleep and Fatigue

Disruptions to normal sleep routines are often associated with night shift, where the major difficulty is getting adequate, high quality, restorative sleep during the day. This is not only because of potential disruptions but also because of the different sleep types (e.g. REM sleep) linked to body temperature.

Extended hours sometimes combined with night work creates a similar problem. The cumulative result of these disruptions is lack of sufficient sleep, which may lead to what is called sleep debt.

Fatigue is tiredness that results from physical or mental exertion. In a hospital the need to concentrate and be on one's feet over a long period of time is likely to cause fatigue.

Both lack of sleep and fatigue, individually and in combination, is associated with cognitive and physical impairment including decreased working memory, attention lapses, diminished motor control and micro sleeps, and can adversely affect task performance levels, individual health and safety and the safety of others.[16]

B.2.3   Disruption to Social and Family Life

Long working hours and on-call work have been associated with lower levels of job satisfaction for hospital doctors and doctors in training. While a culture of long working hours is often viewed as necessary to meet patient care and training requirements in medicine[17], work scheduling will influence the availability of employees to participate in social and family activities. Shift workers find it difficult to maintain a social and family life and sometimes may neglect rest and sleep in order to be with friends or family.

The dislocation of family and social life may result in pressures on relationships, excessive domestic workloads and inability to participate in community activity. As with sleep and fatigue, this has implications for task performance and health and safety.

Systematic reviews of the literature on the effect of reducing or eliminating extended shifts have found significant improvements in reported levels of overall fatigue, sleep and satisfaction.[18] Research now confirms that working longer hours is associated with poorer reported health, poor opportunities for professional development and lower job satisfaction amongst doctors'.[19]

B.2.4   Effects on Health

Fatigue is a significant concern for doctors working long hours and rotating shifts and has major health consequences. Strong evidence exists that shiftwork is associated with detrimental effects on mental health, a higher risk of several medical conditions particularly metabolic syndrome and cardiovascular diseases, and higher rates of miscarriage and premature birth for female shiftworkers.[20,21,22,23]

People who have short sleep duration are at 1.48 times greater risk of developing and dying of coronary heart disease than controls and 1.15 times more likely to have a stroke.[24] Insufficient sleep also affects immunologic function and development of mood disorders and is associated with depression; deficits in cognition, memory and learning; and reduced quality of life. [25]

The beyond blue National Mental Health Survey of Doctors and Medical Students survey revealed that long working hours, a need to balance competing work and personal demands, and a stressful work environment contributed to the high general and specific levels of distress, and high levels of burnout reported by both doctors and students in the survey. Sleep deprivation is also cited as one of the main contributes to burnout and poor mental health in other studies.[26] The survey recommended increasing resources and the size of the workforce, and limiting excessive work hours as strategies to reduce the burden on overworked doctors and to address stressful working environments.[27]

One major consequence of insufficient sleep and disturbances to circadian rhythms is daytime sleepiness, which affects performance particularly the speed at which procedures are undertaken, alertness and vigilance to identify problems, leading to occupational and medical errors, workplace injuries, impaired driving, and motor vehicle accidents. The risk of accidents and near miss events is significantly higher in shift workers, and sleep deprivation related to shift work is linked to an increased risk of needle stick injury in health care workers and car accidents after shifts.[28]

Difficulty in being able to follow health or medication regimes because of schedules is another factor influencing the health of employees.

In an examination of all these issues it is important to recognise that individual differences in response to the disruptions of circadian rhythms, normal work and sleep routines and dislocation of social and family life may be significant.

In the absence of definitive evidence about those best suited to shiftwork the best means of managing these differences is through informed participation by doctors in the work scheduling process, allowing adequate time for recovery sleep and minimising extended duration shifts where possible.

B.3   EDUCATION

The evidence is clear that excessive working hours are fatiguing and compromise performance and learning.[29] Research in the Australian context suggests a 21% reduction in night time performance compared with day time performance in tertiary hospital emergency registrars presented with Fellowship exam scenarios.[30]

More recently what is an appropriate balance between working hours, training and lifestyle demands for doctors in training has come under intense scrutiny, with concern being expressed about the impact of reduced working hours on training quality.[31] In this context some Colleges are proactively looking at how requirements for clinical experience and requisite patient exposure can be met, and have developed recommendations for safe working hours and rostering.[32]

Ongoing efforts are needed to ensure training experiences, supervision opportunities, service provision and continuity of care is maximized. Potential solutions include promoting safe rostering practices, redesigning rotas, providing appropriate medical staffing, exploring alternate methods of training e.g. simulation technology, and providing adequate educational governance.[33,34,35]

B.4   PATIENT SAFETY AND QUALITY OF CARE

Sleep propensity, or the likelihood of falling asleep, in doctors has been associated with an increased risk of many types of error, including diagnostic, education and procedural mistakes. US studies have found an increase in preventable medical errors and complications where physicians/medical residents worked frequent extended shifts and long work weeks and were sleep deprived.[36,37,38] While increasing numbers of doctors in training and roster reform presents an opportunity to reduce extended shift hours and improve sleep opportunities, ineffective handover represents a real risk to patient safety, and any changes to rostering must be accompanied by improved handover practices.

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Better access to high speed broadband for rural and remote health care - 2016

1.   Introduction

Approximately 30 per cent of Australia's population lives outside the major metropolitan areas[1]. Regional, rural and remote Australians often struggle to access health services that urban Australians would see as a basic right. These inequalities mean that they have lower life expectancy, worse outcomes on leading indicators of health, and poorer access to care compared to people in major cities.

In 2016 the AMA conducted a Rural Health Issues Survey, which sought input from rural doctors across Australia to identify key solutions to improving regional, rural and remote health care. The survey identified access to high-speed broadband for medical practices as a key priority.

This result reflects not only the increasing reliance by medical practices on the internet for their day to day operations, but also the increasing opportunities for the provision of healthcare services to rural and remote communities via eHealth and telemedicine. For the full potential of these opportunities to be realised, good quality, affordable, and reliable high-speed internet access is essential.

The AMA recognises that technology-based patient consultations and other telehealth initiatives can improve access to care and can enhance efficiency in medical practice, but the need for better access to high speed broadband goes beyond supporting rural and remote health. In today's world, it is a critical factor to support communities in their daily activities, education, and business, and has the potential to drive innovation and boost the rural economy.

This position statement outlines the importance of better access to high speed broadband for medical practices, other healthcare providers and institutions, and patients, to improve regional, rural and remote health care in Australia, and highlights key solutions for achieving this.

2.   Internet access in regional rural and remote Australia

Despite its tremendous growth, internet access is not distributed equally within Australia, and internet use by country people has yet to reach the level of use in capital cities, for a wide range of reasons.

In many country areas the internet connection is still very poor.[2] In 2015, 80 percent of non-urban Australians had an internet connection at home compared with 89 percent of those in capital cities[3]. Internet use via mobile phone was much lower in non-urban areas, at 37 percent, compared to 60 percent for capital cities[4]. This reflects the patchy, unreliable or absent mobile coverage in many rural and remote areas. While mobile broadband use was highest in non-urban areas, at 29 percent, compared to 25 percent in capital cities, mobile broadband is currently not a good solution for business or eHealth, due to the relatively small amounts of data on the relatively costly plans available.

Internet services, particularly in more isolated areas, only make available relatively small

download allowances and these come at a much higher cost and slower speed than those services available in metropolitan areas.

3. Supporting regional rural and remote health

3.1   The need for better access for health services

The health sector needs telecommunications connectivity for health service delivery and management, doing business with Government and complying with Government requirements, continuing professional development, online education, mentoring, and clinical decision and other support.

Health was identified in the Regional Telecommunications Review report[5] as one of the particular segments of the community requiring special consideration. To effectively leverage telecommunications technology to deliver better health outcomes at lower cost in regional, rural and remote areas and to implement new models of health care, both mobile and broadband technology must be reliable, affordable, and supply adequate capacity.

However, the utilisation of telehealth and telemedicine in rural and remote Australia remains patchy and is not used to full potential, because of no, or inadequate internet access. As noted in the Regional Telecommunications Review report[6], the ability of hospitals and clinics to support remotely located clinicians and patients via video conferencing and remote monitoring could be severely limited in areas serviced by satellite, which may not be able to consistently and reliably deliver the necessary capacity and technical capability.

The AMA Rural Health Issues Survey received many comments from rural doctors on the problems encountered with poor internet access. For example:

> *High-speed broadband [is the] single most critical issue to run practices now, many areas not getting the best from NBN.*
>
> *Internet services by satellite are slow and time consuming. Reliable internet services at reasonable speed and reliability is critical.*
>
> *Internet services are a critical area [of concern]. The NBN has been deficient in providing a comprehensive coverage even in areas that are under 25km from a major regional centre i.e. Orange and Dubbo.*

As mainstream healthcare provision becomes increasingly technology based and requires more and faster broadband services to operate, there is a real risk that regional, rural and remote areas of Australia will be left further and further behind in their ability to provide quality health services.

3.2.   The benefits of high speed broadband for rural and remote health care

High-speed affordable broadband connectivity to the Internet has become essential to modern society, and offers widely recognised economic and social benefits, with numerous studies showing a strong link between broadband growth and rapid economic development[7]. Affordable and reliable broadband access can support the development of new content, applications and services that allow people to work in new ways, changing business processes in ways that stimulate productivity and potentially increase labour-force participation[8].

3.2.1 Economic benefits

It has been estimated that in New Zealand, the benefits from broadband-enabled health care could reach around $6 billion over a 20-year period[9]. These benefits come from reduced hospital, travel and drug costs and improvements in care. A case study by Deloitte Access Economics shows savings to a single older Australian of $7,400 per year, with savings to the Government, through reduced health and service provision costs, of over $14,500[10].

3.2.2 Driving greater efficiency and reducing costs

Telehealth practice will be one of the most important online services in the broadband future, enabling significant changes to work practices to drive greater efficiency and reduce costs[11].

If sufficiently supported, telehealth services, such as video-conferencing, could become more effective in complementing local health services. They could be used to expand specialty care to patients in areas with shortages of health care providers as well as extend primary care to remote areas, reducing the need to travel, and increasing the frequency of patient and primary care provider interactions. By providing timely access to services and specialists, telehealth could improve the ability to identify developing conditions, and thereby reduce the need for more costly treatments and hospitalisations in the future. Telehealth could also help to educate, train and support remote healthcare workers on location and support people with chronic conditions to manage their health.[12]

A CSIRO report on home monitoring of chronic disease[13], for example, shows that a modest investment in home monitoring technology, allied to risk stratification tools and remote monitoring, could save the healthcare system up to $3 billion a year in avoidable admissions to hospital, reduced length of stay and fewer demands on primary care.

3.2.3 Supporting eHealth solutions now and into the future

eHealth encompasses patient access to doctors via online consultation, remote patient monitoring, online tools and resources for patients and doctors, clinical communications between healthcare providers, and professional's access to information databases and electronic health record systems. If sufficiently supported with affordable, high-speed broadband services, eHealth has potential to improve health outcomes at all levels, from preventative health, specialist and acute care and self-management of chronic conditions, through to home monitoring for people living with disabilities[14].

Advances in information technology will act as a catalyst for the development of a range of potential eHealth solutions to some of the challenges faced by rural and remote communities. If available and accessible, improved connectivity will facilitate new and emerging best practice models of health care, such as those which incorporate high definition video conferences, data exchange and high resolution image transfer[15].

Technological advancements in health care that could become the way of the future, if affordable and sufficient access to broadband services becomes available, include better point of care diagnostics, resulting in faster, cohesive patient care; biosensors and trackers to allow real time monitoring; 3D printed medical technology products; virtual reality environments that could accelerate behavioural change in patients; and social media platforms to improve patient experience and track population trends[16].

3.2.4 Supporting education and training

The internet also plays a big part in the lives of doctors and their families, assisting with education and social cohesion. It enables rural doctors to learn from the most current resources, explore treatment options, watch demonstrations of procedures and attend live discussions with experts.

Access to high speed broadband has the potential to change the way medical education, training and supervision is delivered in rural and remote areas[17]. As pressure on access to prevocational and vocational training places increases, harnessing this technology to support training is a viable strategy to create additional training places in rural and remote locations and ultimately improve access to specialist services for rural and remote patients.

The use of telehealth and telesupervision as an adjunct to face-to-face teaching will allow doctors in training to remain in rural and remote settings to complete their training, and enhance the likelihood that they will choose to work long term in a rural areas. Improved information and communications technology will enhance the learning experiences for trainees at rural sites and during rural rotations, provide exposure to innovative models of care, and improve supervisor capacity by allowing supervisors to transfer knowledge, supervise and mentor trainees remotely.

Improved telehealth and communication technology infrastructure to support teaching and training at rural sites will also enhance professional collaboration between rural and remote medical generalist practitioners and other specialists in the provision of shared care, skills transfer and education.

The requirement for doctors to maintain their skills is a fundamental component of medical registration. It is important that processes mandated by the Medical Board of Australia, including in revalidation proposals, do not discriminate against medical practitioners working in rural and remote Australia. Access to high speed broadband is an essential support for rural and remote practitioners who must comply with these requirements.

4.   What can be done to improve broadband access for country Australians?

The AMA is of the view that high-speed broadband should be available to the same standard and at the same cost to all communities, businesses and services across the whole of Australia. The platforms used must be able to accommodate future developments in information and communications technologies and provide connectivity through suitable combinations of fibre, mobile phone, wireless, and satellite technologies. For rural practices, in order to be incorporated routinely in everyday practice (clinical, educational and administrative), network connectivity must be sufficient, reliable, ubiquitous and dependable.

The Government must ensure that broadband services are affordable in regional, rural and remote Australia. Lack of affordability is regarded as one of the most important barriers to good internet access for country people whose incomes, on average, are 15 per cent lower than those of city people[18].

Government policies play a tremendous role in bringing internet access to underserved groups and regions. Unless issues around equitable and affordable access to telecommunications in regional, rural and remote Australia are addressed, the potential benefits of the digital economy for non-urban Australians will go unrealised.

The AMA urges the Government to consider the following actions:

- Fully consider the recommendations of the 2015 Regional Telecommunications Review, and, in particular, adopt Recommendations 8, 9, and 12, to:
  - Develop a new Consumer Communication Standard for voice and data which would provide technology neutral standards in terms of availability, accessibility, affordability, performance and reliability.
  - Establish a new funding mechanism, the Consumer Communication Fund to replace the existing telecommunications industry levy and underwrite over the longer term, necessary loss-making infrastructure and services in regional Australia.
  - Collect benchmark data on availability and affordability of broadband data and voice services (including mobile services), to be reported annually, in order to improve the understanding of the changing circumstances of regional telecommunications.

- Extend the boundaries of the NBN's fibre cable and fixed wireless footprints and mobile coverage wherever possible.

- Begin an incremental process of terrestrial network expansion over the longer term to address increase in usage over time.

- Develop measures to prioritise or optimise the broadband capacity available by satellite for hospitals and medical practices, such as exempting or allocating higher data allowance quotas, or providing a separate data allowance (as is the case with distance education[19]).

- Create universal unmetered online access to government, hospital and health services for people and businesses in rural and remote areas.[20]

- Establish an innovation budget for development of local infrastructure solutions for rural and remote areas.[21]

- Engage with state and local government and related stakeholders who wish to co-invest or coordinate planning to achieve the optimum overall infrastructure outcome for their area. This could involve public-private partnerships or the leveraging of philanthropic infrastructure funding through, for example, tax concessions.

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