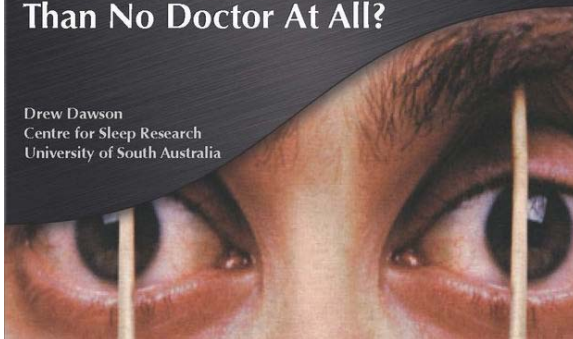


Can a Tired Doctor Be Better Than No Doctor At All?


Drew Dawson
Centre for Sleep Research
University of South Australia



Controversies in Staffing

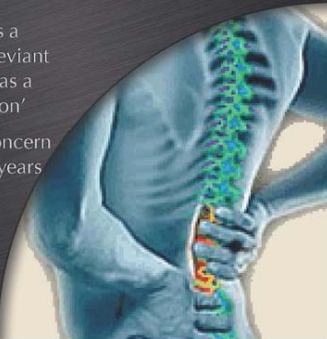
1. Limiting working hours is unlikely to reduce overall patient risk
2. Without additional risk mitigation limiting working hours may paradoxically increase patient risk

Dawson & Zee (2005) JAMA; 294(9):1104-6.



Political Context

- Tradition of long hours is a culturally normalized, deviant behavior misinterpreted as a 'demonstration of vocation'
- Increased community concern over the issue in last 10 years
- OH&S reforms have redefined fatigue as a workplace hazard for which **management** is equally responsible



Legal Context

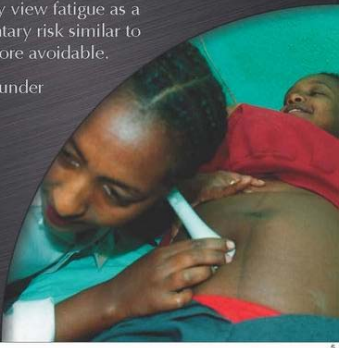
- Shift from 'diminished capacity' to 'voluntary impairment'
- Shift away from strict personal accountability to include managerial and organizational accountability
- Key principle of 'reasonable foreseeability'



Liability

Courts and juries increasingly view fatigue as a reasonably foreseeable voluntary risk similar to drugs and alcohol and therefore avoidable.

- Organisational Liability under Tort law
- Liability cannot be 'outsourced' via sub-contract relationships
- Chain-of-responsibility means liability flows upward from practitioner to organization.



Community Response

Education

- awareness programs focussed on risk recognition for target groups

Regulation

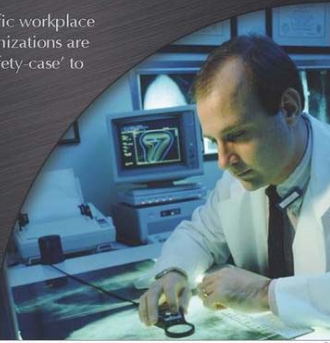
- Increased prescription
- Co-regulation
- Safety Management System approach



Regulatory framework for fatigue

Fatigue identified as a specific workplace hazard under OH&S. Organizations are required to implement a 'safety-case' to manage the hazard.

- Shared responsibility framework [duty of care/OH&S]
- Risk-based framework [AS 4360]
- Safety Management System framework [AS 4801]



A Risk-based framework

- Fatigue-related risk is the product of the **likelihood** and **consequence** of a fatigue-related error
- The level of hazard control should reflect the potential consequences of a fatigue-related error associated with the task
- Reducing hours can increase risk paradoxically through reduced availability of health care providers




The Challenge

- Long hours of work are a traditional work practice
- Workloads are increasing while labor supply is falling
- Prescription can produce paradoxical outcomes
- No single solution suitable for all contexts



Key Elements of a Fatigue Risk Management System: The Queensland Health Project

- FRMS policy document
- Competency-based Training and Education program
- Auditable methodology to ensure a safe level of alertness [SLA] for staff.
- Auditable methodology to ensure compliance with 1-3




Conceptual Framework: An FRMS is a 'shared responsibility'

- **The Organisation** is responsible for preventing excessive duration of wakefulness at work and inadequate sleep opportunities between shifts.
- **The individual** is responsible for using time between work periods to obtain sufficient sleep. Employee to engage in appropriate risk mitigation should this not occur.
- **Line managers** are responsible for providing clear guidelines on how to manage an insufficient sleep/excessive wake incident



Key Elements of a Fatigue Risk Management System

- FRMS policy document
- Competency-based Training and Education program
- Auditable methodology to ensure that employees are fit-for-work
- Auditable methodology to ensure compliance with 1-3



Training and Education


- Competency-based [i.e. assessment is required]
- Three levels
 - **All staff** - Personal Fatigue Management Strategies
 - **Line Managers** - Managing fatigue-related risk in the workplace
 - **Accountable Executives** - Designing, implementing and evaluating an organizational FRMS
- Australian curricula for Classroom, video/workbook and/or web-based delivery of training materials @ <http://www.humantra.com>



Key Elements of a Fatigue Risk Management System

- FRMS policy document
- Competency-based Training and Education program
- **Auditable methodology to ensure that employees are fit-for-work**
- Auditable methodology to ensure compliance with 1-3





4 possible interception points on the Potential Incident Trajectory for fatigue

Queensland Health: Preliminary findings

- Fatigue was not distributed homogenously across staff or time
- Using FAID analysis, on average, less than 10% of total hours worked are at high levels of fatigue [FAID>100]
- Main causes of fatigue are
 - preventable interruptions of sleep during extended call shifts
 - poor triage of non-critical work by single professionals in remote locations.



Queensland Health: Preliminary findings

- lack of any formal organisational system for systematically managing fatigue other than labor agreements.
- Few, if any, organisational counter-measures in effect
- Significant informal fatigue management systems but poorly generalised and often viewed as 'illegal' activities
- Significant opportunities for risk reduction using level 2-4 interventions



Example of a Medical FRMS

- **FRMS policy** introduced centrally by Hospital with local unit variations developed by unit patient safety group and approved by central Patient Safety and OH&S committees.
- **Training and education** workshop and workbooks completed by all staff. Attendance compulsory and documented by unit manager. Line and Risk managers undertook 2 day SMS workshop delivered by UniSA.
- **Audit System - Level 1 Control:**
 - Stage 1: Redesign of schedules using shift risk analysis tools [FAID] to ensure adequate average sleep opportunity.
 - Risk-based approach included a detailed discussion of
 - labour supply issues and shift to 'team-based' approach
 - additional controls required to ensure risk homeostasis.

Level 2 Controls: Personal Fatigue Likelihood Score

The diagram illustrates a timeline of sleep and work periods. Two 'Sleep' blocks are shown, followed by a 'Work' block. Above the timeline, 'Prior sleep [48h]' spans the first sleep block, and 'Prior sleep [24h]' spans the second sleep block. Below the timeline, 'Prior wake' spans the work block. Three variables are defined: X = sleep in prior 24 hours, Y = sleep in prior 48 hours, and Z = Time since last sleep.

X = sleep in prior 24 hours **Y = sleep in prior 48 hours** **Z = Time since last sleep**

As prior sleep decreases and prior wake increases the likelihood of fatigue (symptoms, errors and incidents) also increases. In general, **X** should be greater than threshold [5], **Y** should be greater than threshold [12] and **Z** should be less than **Y**.

Calculate Personal Fatigue likelihood Score

- Add **4** points for every hour of sleep below the **24 hour** prior sleep threshold [X]
- Add **2** point for every hour below the **48 hour** prior sleep threshold [Y]
- Add **1** point for every hour of work beyond the **prior wake** threshold [Z]
- Sum and refer to decision tree to determine appropriate response

Handwritten equations on a whiteboard include:
 $E = -F \frac{dy}{dt} \frac{dy}{dx}$
 $F_{AV} = \frac{1}{2} \rho v v \omega^2 A^2$
 $F_{AV} = I = \frac{(\Delta P)^2}{2\rho v} = \frac{1}{2} \rho v \omega^2 A^2$
 $= (10dB) \log_{10} \left[\frac{I}{10^{-12} W m^{-2}} \right]$
 $I(r) = I_0 \frac{r_0^2}{r^2}$
 $v' = f \left(\frac{v-v_0}{v-v_0'} \right)$
 = observer speed

Agreed countermeasures in response to non-zero Personal Fatigue Likelihood score

Score	Agreed response
0	Do nothing unless higher level [3+] hazards are present
1-5	Document locally with supervisor and undertake approved individual countermeasures. Implement fatigue-proofing SOP's. Self monitoring for symptoms, napping, strategic caffeine, team monitoring by colleagues, task rotation etc.
6-12	Document externally by supervisor. Complete symptom checklist. Use of pre-approved load shedding, work-load re-assignment and 'protection' of health worker by team.
12+	Document externally. Patient interaction must be risk assessed and only undertaken where appropriate and specifically authorised by consultant or appropriate hospital risk manager.

Additional Controls implemented

- **Level 2:** Established minimum sleep/wake requirements to be Fit-For-Work
 - [e.g. 5/12 rule] and 'countermeasures' table for managing staff not fully Fit-For-Work.
 - all non-zero PFL score recorded by unit and reported quarterly to FRMS/Patient Safety Committee for review
- **Level 3:** Care-team workshops during training sessions to agree on criteria for self/peer identification of fatigue along with pre-determined selection of situation/discipline specific countermeasures.

Example of a Medical FRMS

- **Level 4:** Major fatigue-proofing program. *A priori* identification of historical error profile and development of SOP's to minimise risk.
 - verbally inform colleagues and supervisors that fatigue risk is elevated. Use of the 'yellow cap' to signal fatigue to others
 - Formal discussion/noting of FRM plan for remainder of shift.
 - higher priority for counter-measures [e.g. nap/breaks/caffeine]
 - non-punitive load shedding and/or task reallocation to co-workers or next shift
 - complex diagnoses/management checked with (senior) colleague
 - double checks on critical dosage calculations by other staff
- **Level 5:** Incident analysis to actively address Level 1-4 evidence in analysis and reporting. Level 4 data on errors used to determine if proximal errors consistent with fatigue-related cause.

