Analysing what goes wrong

Interruptions and the impact on safe practice

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Impact of work patterns on cognitive load and performance?

Experimental evidence from psychology demonstrates interruptions and trying to multi-task add significant cognitive load → task errors.

Internationally, well recognised that Emergency Department physicians experience a high rate of interruptions

Multi-tasking is promoted as a effective work strategy

Can experimental findings be shown in real-world clinical work settings?

Driving and mobile phone use

MACQUARIE University

Simulations show that just listening to a passenger reduces driver performance – e.g. lane deviations

Drivers who use a mobile phone are 31% more likely to experience an accident involving injury or death

Studies in health on the effects of interruptions on work

Simulation studies:

- Nurses interrupted during chemotherapy administration - more errors than those not interrupted (Prakesh et al 2014)

- Operating room simulation - anaesthetists who immediately responded to an interruption failed to check a blood product before transfusion. (Liu et al 2009)

MACQUARIE University

Aim: To understand the extent to which interruptions and multi-tasking may be associated with task errors in the emergency department

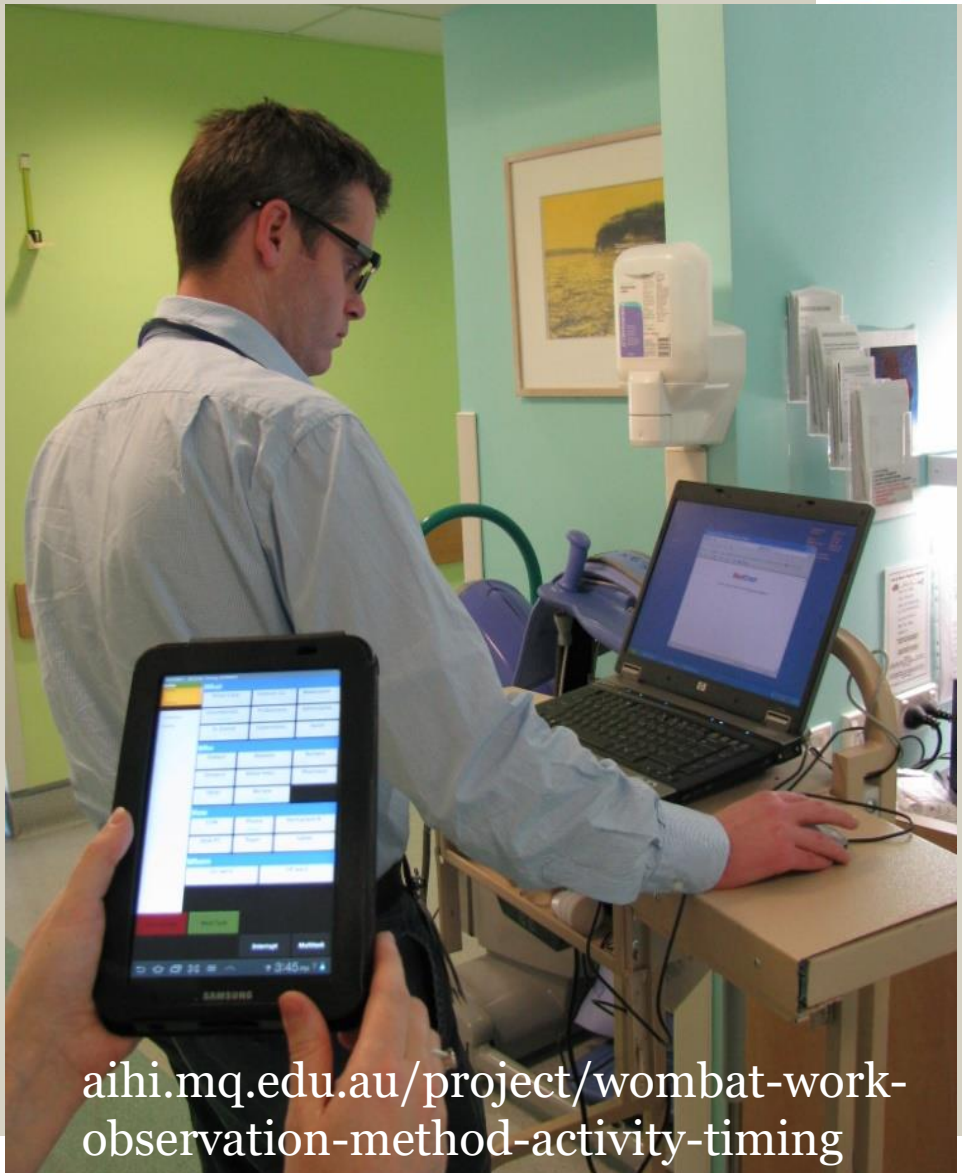
Observational Study in Sydney Emergency Department

- Dayshifts 08:00-18:00
- 36 Doctors – shadowed for 120 hours, 58 sessions
- Demographics of drs and patient age; ED workload
- Collected information on all tasks, interruptions and multi-tasking
  - **Interruption** - an observable external stimulus resulting in a change in a physician's task.
  - **Multitasking** - conducting two tasks in parallel

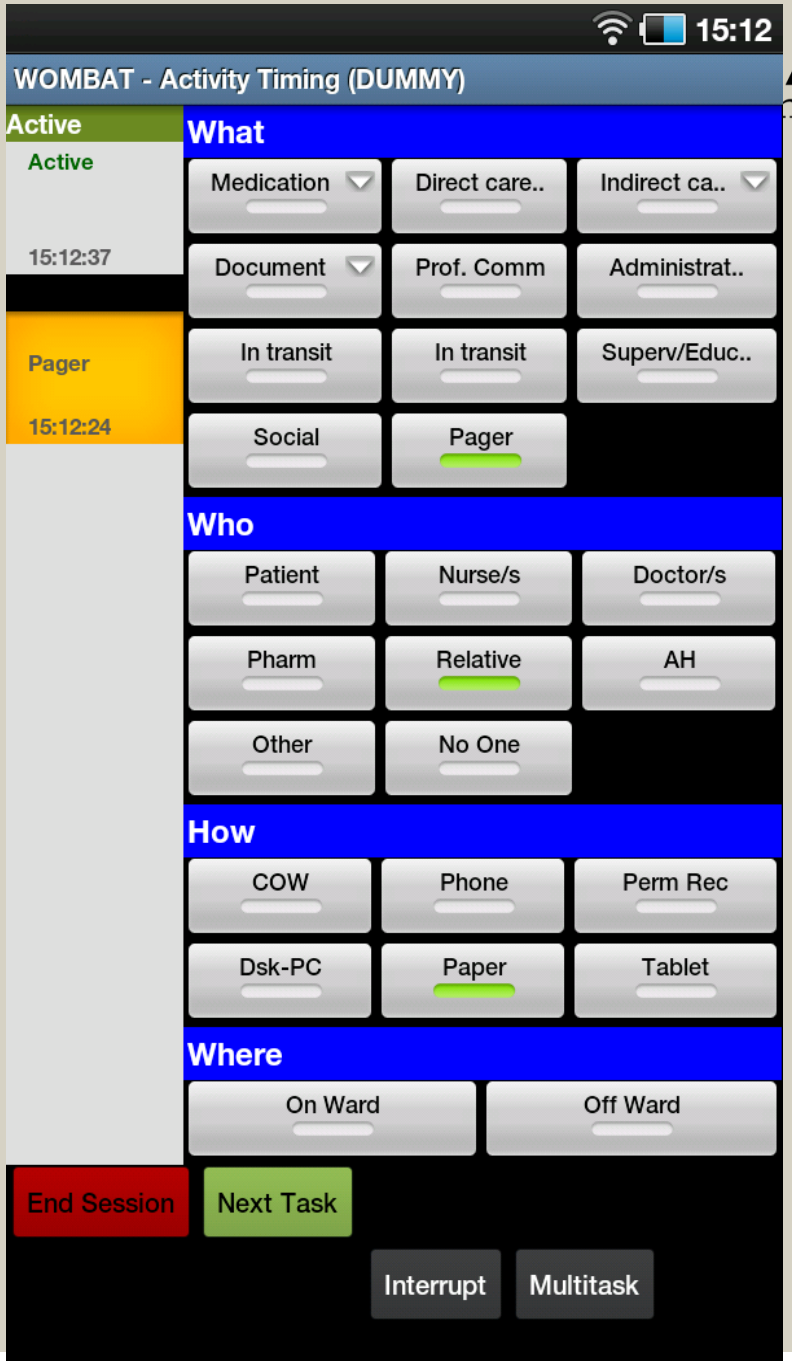
Methods

- Completed Working Memory Capacity – OSPAN task (WMC - Ability to temporarily store and retrieve information ready for processing)
- Reported sleep in the 24 hours prior to observation session
- Identified all prescribing tasks during observations and later assessed these for errors.
- Multivariate analyses of prescribing error rates to determine associations with interruptions and multitasking also considering Dr characteristics

Work Observation Method By Activity Timing



aihi.mq.edu.au/project/wombat-work-observation-method-activity-timing



Sleep

In the previous 24 hours did you get your average, or more/less average sleep?

Average sleep for an ED physician?

What % of Physicians reported average sleep?

Average Sleep = 6.7 hours in 64.3% sessions

< average = 5.6 in 19.6% of sessions

> average = 7.8 in 16.1% sessions

Recommended sleep for adults 7-9 hours

Interruptions and Multi-tasking

MACQUARIE University

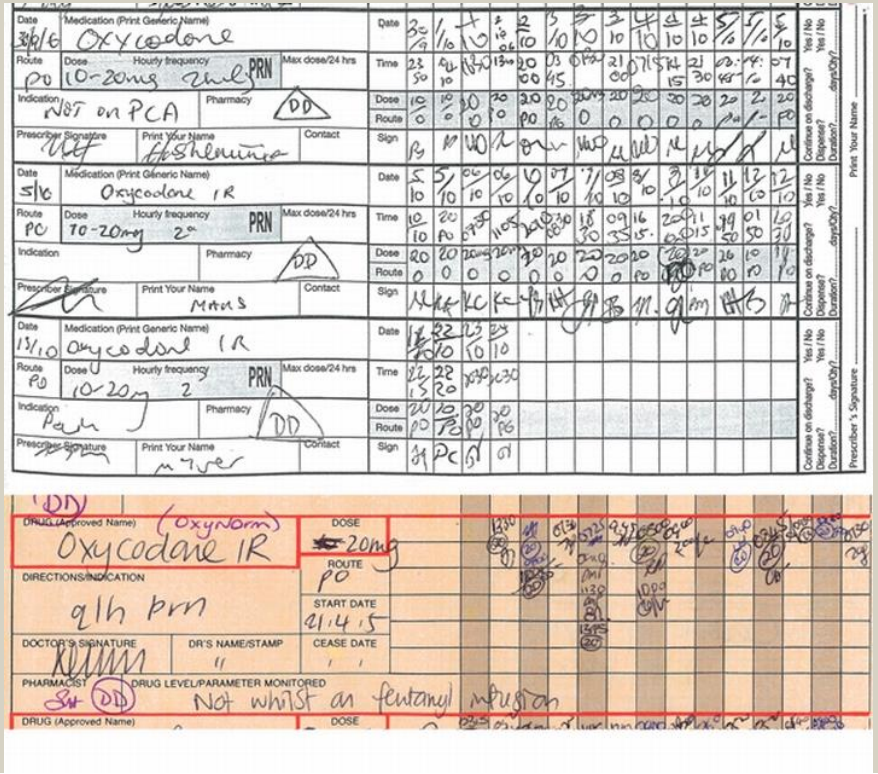
7.9 interruptions/hour; 9.4/hour when prescribing

Spent 4.6% of overall time multi-tasking

20.1% of prescribing time multi-tasking

Prescribing Errors

- 27 clinical errors, 181 legal/procedural errors
- Clinical error rate 11/100 orders; 0.4/patient
- Legal/procedural 76/100 orders; 2.6/patient



Legal/procedural errors

Error type	Medication order	Description of error
Incomplete order	Oxycodone 5-10mg orally when required, up to a maximum dose of 20mg	Frequency omitted from order
Incomplete order	Morphine 2.5mg subcutaneously every four hours when required	Maximum daily dose omitted from order
Unclear order	Heparin 5000 units subcutaneously twice daily	Abbreviation 'SC' used to indicate route, but this was unclear and looked like 'SL'.
Brand name used	Tenormin 50mg orally once daily	Brand name used instead of generic (atenolol)
Unapproved abbreviation	Simvastatin 40mg orally at night	Abbreviation 'on' used to indicate at night

Clinical Errors

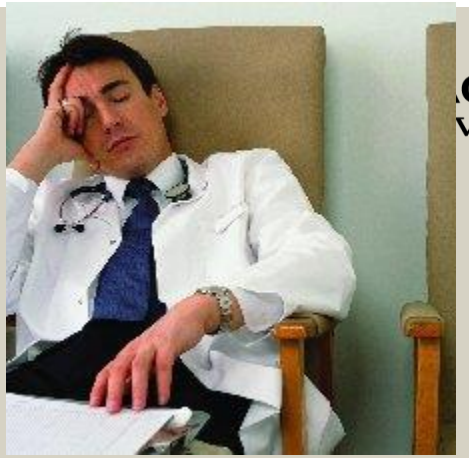
Error type	Medication order	Description of error
Wrong drug (drug-disease interaction)	Metoclopramide 10mg intravenously three times daily when required	Prescribed for patient with Parkinson's disease.
Wrong drug (drug-disease interaction)	Aspirin 100mg orally once daily	Prescribed for patient with corrosive gastritis/duodenitis and for whom there was no active disease for which aspirin is required.
Wrong dose	Fexofenadine 120mg orally once only	Prescribed for allergic urticaria involving lip, eye and skin. Indicated dose for urticaria is 180mg.
Duplicated drug therapy	Paracetamol 1g orally four times daily when required	Regular paracetamol (1g three times daily) already charted, potentially exceeding maximum daily dose of 4g.
Wrong strength	Thyroxine 50mg orally once daily	Dose should have been 50mcg.

Legal/Procedural errors (e.g incorrect units, incomplete order)

Errors were significantly associated with:

- Multitasking during prescribing
  - RR 1.86 (1.35-2.56), p<0.001
- Consultants made more procedural errors than junior dr
  - p<0.001
- Drs with higher WMC scores made significantly fewer errors
  - For every 10 point improvement in WMC test score there was a 19% decrease in error rate
- Sleep and interruptions were not associated with procedural errors

Clinical prescribing errors (e.g wrong drug, dose)



Errors were significantly associated with:

- Interruptions during prescribing
  - RR 2.82 (1.23-6.49), p=0.015
- Consultants made fewer clinical errors than junior dr
  - p<0.002
- Drs with higher WMC scores had significantly fewer errors
  - For every 10 point improvement in their WMC test score there was a 19% decrease in error rate
- Doctors with below average sleep had a clinical error rate **>15 times** that of doctors who had average sleep
  - RR 16.44, p<0.001

Clinical Prescribing Errors

No association with doctors' age (p=0.06)

Multi-tasking while prescribing (p=0.15)

Conclusions

- Interruptions and multi-tasking both associated with increased task error rates
- Clinicians with higher working memory capacity performed better
- Adequate SLEEP is fundamental to performance
- Support experimental findings

Implications for ED Work

- Interruptions and multi-tasking are perceived as inherent elements of efficient clinical work
- Often reinforced by organisational messages
- Blanket interventions unlikely to be useful
- Options:
  Limit unnecessary interruptions
  Train in use and management
  Re-design work spaces or move tasks
  Increase use of cues to support recovery

Task errors by emergency physicians are associated with interruptions, multitasking, fatigue and working memory capacity: a prospective, direct observation study

Johanna I Westbrook,[1] Magdalena Z Raban,[1] Scott R Walter,[1] Heather Douglas[2]

BMJ Qual Saf 2018;**0**:1–9. doi:10.1136/bmjqs-2017-007333

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Analysing what goes wrong

Systems issues in errors

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Determinants of safety – a system perspective

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PAST PRESIDENT ACEM/IFEM
ACADEMIC DIRECTOR ALFRED EMERGENCY AND TRAUMA CENTRE

Outline

- Safety Depends on……

- Common Aim – Define the goal
- People
  - Number
  - Skills/training
  - Culture/relationships
- Facilities
  - Size
  - Layout
  - Equipment
  - Geography

- Organisation
  - Monitoring
  - governance
  - Culture
- Organisations Caring enough to make it safe!

In Victoria (and potentially Australia/NZ)

- Some Practical Steps…..
- Step 1
  - Agree on evidence based or consensus clinical pathways
    - ie define "safe approach"
  - Establish Standardised guidelines
  - Make Accessible
    - Reputable/maintained website
    - College/DHHS
  - Implement guidelines
    - Workshops
    - Training packages
  - Monitor guidelines
    - Identify gaps in translation
      - Audit
      - registries

STEPS

- Step 2
- Agree on facilities needed to implement guidelines across state
  - Identify gaps
    - Strategies to address gaps
  - Capability framework and referral pathways
    - Measure access/equity
  - Account for geography/logistics

STEPS

- Step 3
  - Identify skills needed to implement pathways
    - Identify gaps
    - Strategies to plug gaps
      - This is not about professional boundaries…..
      - Upskilling
        - Targeted courses/workshops
        - Accessible formats
          - Not prolonged courses
      - Telehealth
        - Do it properly this time
      - Network support with larger facilities
        - Accountability of larger organisations?

STEPS

- Step 4
  - Agree on organisational principles necessary to facilitate best practice pathways
    - Identify gaps
      - Quality framework
    - Strategies to remedy
      - Capability framework
      - Referral pathways
      - Accountability/responsibility
      - Monitoring

Overall

- Tackling pt safety at a local level is of limited value
- Systems approach necessary
  - **Standardisation** of practice
  - Agreed aims
  - System wide **monitoring**
    - Agreed quality frameworks
    - Accountability at local level
    - Transparent feedback
    - System wide support

Who is going to do this?

- College?
- Health Departments?
- State vs federal?
- Clinical networks?

Conclusion

- Australia has basic building blocks for safety in place
- Lacks systems approach
- Probably best done at state level
  - BUT national coordination/agreement
- College potentially has a big role
- Clinicians need to drive this

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Analysing what goes wrong

Case Study Discussions

Procedural
Location: Training Room (stay where you are)
A/Prof Thomas Chan

Diagnostic
Small Training Room
Dr Carmel Crock

Medication
Boardroom
Dr Kim Hansen

Analysing what goes wrong

Report key learnings from group discussions

Facilitated by Dr Anh Tran

Emergency Physician, Emergency Department

Werribee Mercy Hospital, Victoria

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