

Little things matter: a time and motion study of pharmacists' activities in a paediatric hospital



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- Pathology and imaging informatics
- Human factors evaluation and design
- Medication safety and eHealth
- Work innovation and communication
- Safety and integration of aged and community care
- Primary care safety

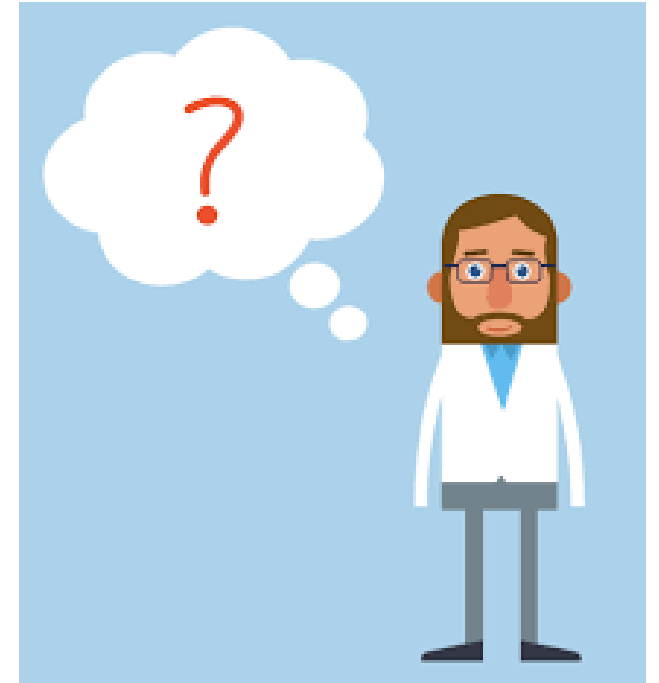
Understanding Work

How do healthcare providers distribute their time?

What work tasks do they conduct?

Who do they interact with?

How often are they interrupted?



Existing Literature

DOCTORS' AND NURSES' WORK

Several time and motion studies of doctors' and nurses' work.

Westbrook et al.¹ found no significant change in proportion of time doctors and nurses spent on direct patient care or medication-related tasks before and after implementation of eMMS. Finding helped alleviate clinicians' concerns about system detracting from time with patients.

¹*Westbrook et al. (2013) Impact of an electronic medication management system on hospital doctors' and nurses' work: a controlled pre-post, time and motion study. J Am Med Inform Assoc.*

Existing Literature

PHARMACISTS' WORK

Limited evidence of pharmacists' work practices. None in paediatrics.

Lo and colleagues² found differences in pharmacists' work in paper-based wards compared to eMMS wards. The authors suggested that differences were attributable to eMMS allowing pharmacists easy access to information for conducting medication reviews and improved clarity of orders reducing queries.

²Lo et al. (2010) *Comparison of pharmacists' work patterns on hospital wards with and without an electronic medication management system (eMMS). J Pharm Pract Res.*

Paediatric Complexities



Additional medication complexities:

Child's age

Size (height, weight, body surface area)

Conditions

Route of administration

Study Aim

To quantify how clinical pharmacists in a paediatric hospital spend their time.



STUDY SETTING

Large paediatric hospital in Sydney, NSW.

Provides services to 80,000 children annually.

Hospital uses paper charts to document clinical notes, medication orders and administrations, while pathology orders and results are electronic.

Method

STUDY DESIGN AND DATA COLLECTION TOOL

Direct observational time and motion using the Work Observation Method By Activity Timing (WOMBAT) technique.



WOMBAT

WHAT IS WOMBAT?

Rigorous and reliable method for investigating healthcare providers work.

Used by several international research teams.

Enables collection of multi-dimensional work, as well as interruptions, and multi-tasking.

Automatically time-stamped data.

Data reflects the complexity of clinical work.

WOMBAT

MULTI-DIMENSIONAL

Can include, but not limited to:

WHAT (the task that is being conducted)

WHO (the person or people with whom the task is being conducted)

HOW (the means by which the task is being completed)

WHERE (the location where the task is being conducted)

The screenshot displays the WOMBAT - Activity Timing (DUMMY) interface. The top status bar shows the time as 15:12. The interface is divided into several sections:

- Active:** A green bar at the top left with the word "Active" in green.
- What:** A blue bar with the word "What" in white, circled in red. Below it are three columns of buttons: "Medication", "Direct care..", and "Indirect ca..".
- Document:** A grey bar with the word "Document" in white, circled in red. Below it are three columns of buttons: "Document", "Prof. Comm", and "Administrat..".
- In transit:** A grey bar with the word "In transit" in white, circled in red. Below it are three columns of buttons: "In transit", "In transit", and "Superv/Educ..".
- Social:** A grey bar with the word "Social" in white, circled in red. Below it are two columns of buttons: "Social" and "Pager".
- Who:** A blue bar with the word "Who" in white, circled in red. Below it are three columns of buttons: "Patient", "Nurse/s", and "Doctor/s".
- Pharm:** A grey bar with the word "Pharm" in white, circled in red. Below it are three columns of buttons: "Pharm", "Relative", and "AH".
- Other:** A grey bar with the word "Other" in white, circled in red. Below it are two columns of buttons: "Other" and "No One".
- How:** A blue bar with the word "How" in white, circled in red. Below it are three columns of buttons: "COW", "Phone", and "Perm Rec".
- Dsk-PC:** A grey bar with the word "Dsk-PC" in white, circled in red. Below it are three columns of buttons: "Dsk-PC", "Paper", and "Tablet".
- Where:** A blue bar with the word "Where" in white, circled in red. Below it are two columns of buttons: "On Ward" and "Off Ward".
- End Session:** A red button at the bottom left.
- Next Task:** A green button at the bottom left.
- Interrupt:** A grey button at the bottom right.
- Multitask:** A grey button at the bottom right.

WOMBAT

CATEGORIES

Within each dimension, are a list of customisable categories.

Can also include subcategories.

The screenshot displays the WOMBAT - Activity Timing (DUMMY) interface. The top status bar shows the time as 15:12. The interface is divided into several sections, each representing a dimension of activity timing. The 'What' dimension is highlighted with a green border and contains a 3x3 grid of buttons: Medication, Direct care., Indirect ca., Document, Prof. Comm, Administrat., In transit, In transit, Superv/Educ., Social, and Pager (which is highlighted in green). The 'Who' dimension is also highlighted with a green border and contains a 3x3 grid of buttons: Patient, Nurse/s, Doctor/s, Pharm, Relative (highlighted in green), AH, Other, No One, and an empty space. The 'How' dimension is highlighted with a green border and contains a 2x3 grid of buttons: COW, Phone, Perm Rec, Dsk-PC, Paper (highlighted in green), and Tablet. The 'Where' dimension is highlighted with a green border and contains a 1x2 grid of buttons: On Ward and Off Ward. At the bottom, there are four buttons: End Session (red), Next Task (green), Interrupt, and Multitask.

WOMBAT - Activity Timing (DUMMY)

Active

Active

15:12:37

Pager

15:12:24

What

Medication Document In transit Social

Direct care.. Prof. Comm In transit Pager

Indirect ca.. Administrat.. Superv/Educ..

Who

Patient Pharm Other

Nurse/s Relative No One

Doctor/s AH

How

COW Dsk-PC

Phone Paper Tablet

Perm Rec

Where

On Ward Off Ward

End Session Next Task Interrupt Multitask

WOMBAT

INTERRUPTIONS

Interruption – an external stimulus resulting in the clinician stopping the current task to respond to the stimulus.

The screenshot displays the WOMBAT - Activity Timing (DUMMY) interface. On the left, a vertical task log shows two entries: 'Active' at 15:12:37 and 'Pager' at 15:12:24. The 'Pager' entry is highlighted in orange. To the right of the log is a form for recording activity, organized into sections: 'What', 'Who', 'How', and 'Where'. Each section contains several buttons with dropdown menus. The 'Pager' button in the 'What' section, the 'Relative' button in the 'Who' section, and the 'Paper' button in the 'How' section are highlighted in green. At the bottom of the form, there are buttons for 'End Session', 'Next Task', 'Interrupt', and 'Multitask'. The 'Interrupt' button is highlighted with a purple border. The top of the screen shows a status bar with a Wi-Fi icon, a battery icon, and the time 15:12.

Active	What	Who	How	Where
Active 15:12:37	Medication Document In transit Social	Patient Pharm Other	COW Dsk-PC	On Ward
Pager 15:12:24	Direct care.. Prof. Comm In transit Pager	Nurse/s Relative No One	Phone Paper	Off Ward
	Indirect ca.. Administrat.. Superv/Educ..	Doctor/s AH	Perm Rec Tablet	

End Session Next Task Interrupt Multitask

WOMBAT

MULTI-TASKING

Multi-tasking – conduct of two or more tasks simultaneously.

WOMBAT - Activity Timing (DUMMY)

Active
Active
15:12:37

Pager
15:12:24

What

Medication	Direct care..	Indirect ca..
Document	Prof. Comm	Administrat..
In transit	In transit	Superv/Educ..
Social	Pager	

Who

Patient	Nurse/s	Doctor/s
Pharm	Relative	AH
Other	No One	

How

COW	Phone	Perm Rec
Dsk-PC	Paper	Tablet

Where

On Ward	Off Ward
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End Session Next Task Interrupt Multitask

Categories for Pharmacists' Study

BASED ON SCHOFIELD ET AL.

Task type	Definitions
Review	Review of medication charts and/or medical notes
Communication	Communicating about anything excluding medications.
Non-clinical tasks	Includes: looking for something, social activities/private, meetings.
Supply	Dispensing medications for patients or maintaining ward stock.
Medication discussion	Talking about anything related to medications.
In transit	Physically moving to change location.
Drug reference	Seeking drug information from references.
Work management	Gathering things, getting ready, organising work tasks.
Other	Includes: training of prescribers to use eMMS, lunch break, anything else.
History taking	Taking a medication history or reconciling medications.
Discharge medication review	Preparing medications on discharge or writing a discharge summary.

Schofield et al. (2015) The impact of electronic prescribing systems on pharmacists' time and workflow: protocol for a time-and-motion study in English NHS hospitals. BMJ Open.

WOMBAT Template for Pharmacists' Study

Two observers familiarised themselves with the data collection tool and definitions.

Used Android tablets running WOMBAT software to collect data.

WOMBAT - Activity Timing (DUMMY)

Active
Active
14:17:08

In transit
14:17:01
Completed Review
14:16:44

WHAT

REVIEW	D/C MED REV..	HX TAKING
MED DISC ▾	COMMUNICATI.. ▾	DRUG REFERE..
SUPPLY ▾	TRANSCRIBIN.. ▾	NON-CLIN ▾
IN TRANSIT	WORK MANAGE..	OTHER ▾

WITH

PATIENT	RELATIVE	DOCTOR
NURSE	PHARM TECH	PHARMACIST ▾
ALLIED HEAL..	ADMIN STAFF..	OTHER

WHERE

BEDSIDE	WARD-ELSEWH..	WARD ROUND
OFF WARD	PHARMACY	DISPENSARY

HOW

FIXED PC	PAPER	PORTABLE DE..
FACE-TO-FAC..	PHONE	PAGER

END SESSION NEXT TASK INTERRUPT MULTITASK

Training to achieve close agreement between the two observers – kappa score of 0.87.

Pharmacists observed between October 2015 to February 2016.

Maximum of 2 hours per session.

7 pharmacists covering eight wards were observed for 62.1 hours.

Pharmacists performed 4,578 individual tasks.

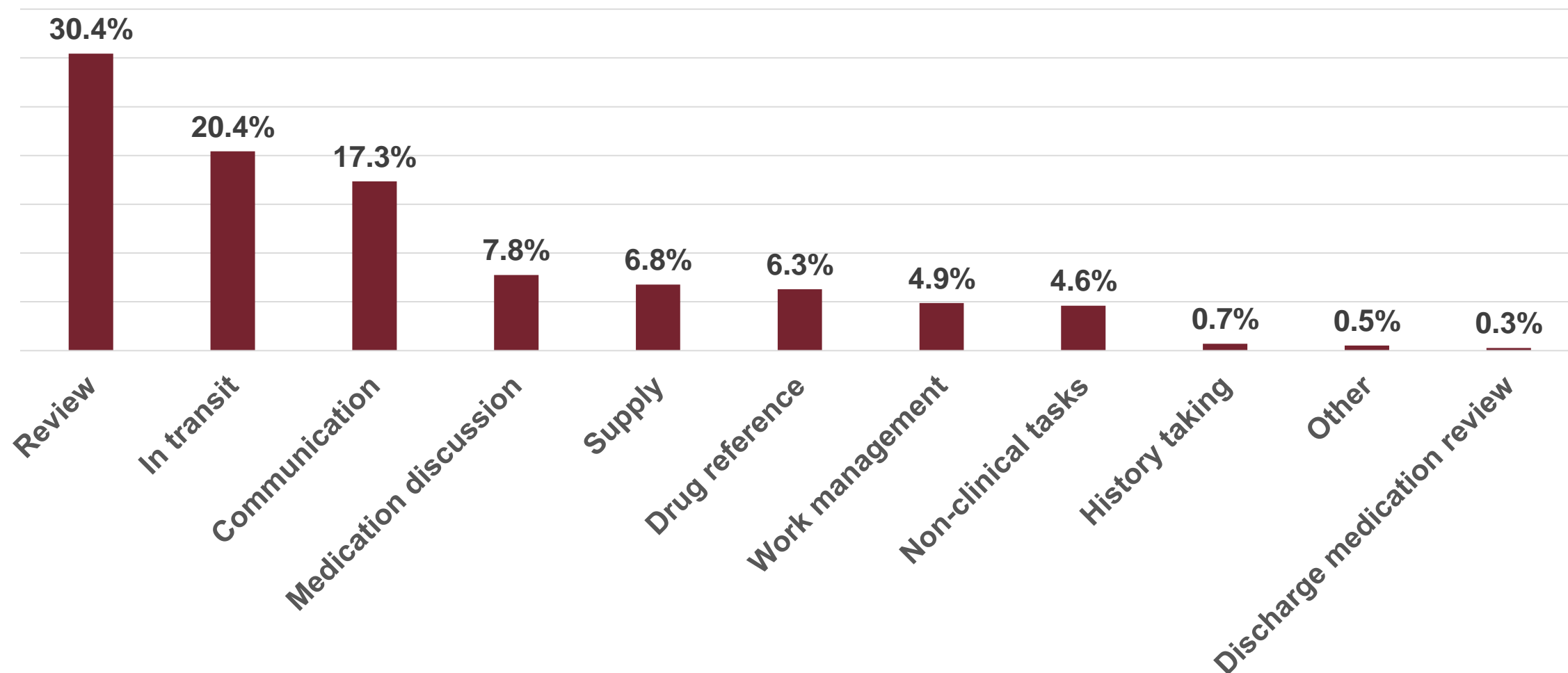
We calculated:

- frequency for each task;
- proportion of time on different tasks;
- time spent multi-tasking;
- and rate of interruptions.

Data were analysed using SAS.

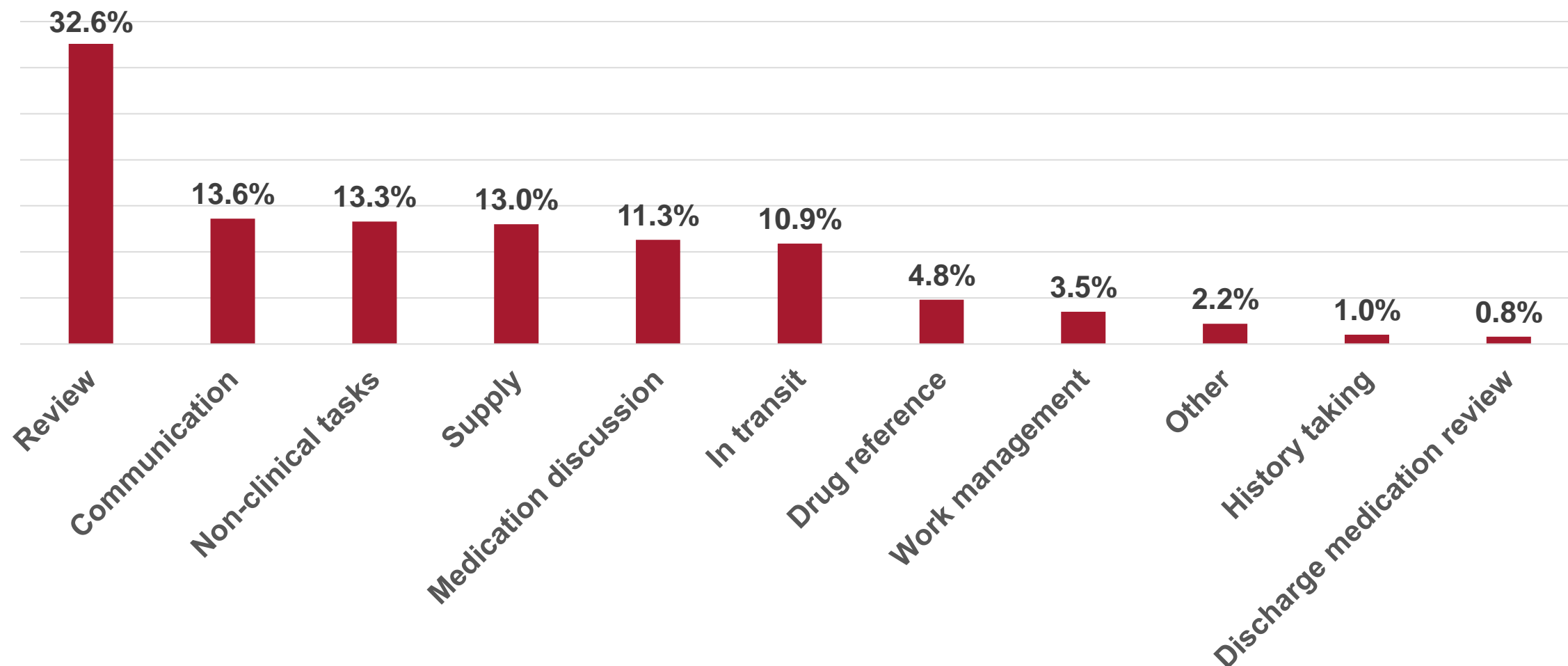
Results

FREQUENCY OF TASKS



Results

DISTRIBUTION OF TIME SPENT ON TASKS



Results

WHERE AND WITH WHO

Almost all medication review tasks were performed on the ward (91.7%).

Only 5.9% of medication reviews were conducted by the patient bedside.

Pharmacists performed most tasks alone (73.6%).

Only 0.3% and 1.4% of tasks involved input from patients or relatives, respectively.

Results

INTERRUPTIONS

Interruption rate of 3.5 per hour.

Interruptions occurred most frequently during:

- work management tasks (6.9 per hour),
- discharge medication review (6.4 per hour) and
- medication review (5.6 per hour).



Results

MULTI-TASKING



Pharmacists spent 2.8 hours (4.4%) of time multi-tasking.

Pharmacists were more likely to multitask during medication discussion, followed by communication, using a drug reference and history taking.

Paediatric pharmacists spend a third of their time reviewing charts and another third divided between communicating with others, performing non-clinical tasks and managing ward-stock.

1% of time was spent taking medication histories. Previous findings from deClifford and colleagues, in an adult hospital, reported 9.5% of time taking medication histories.

Number of interruptions to pharmacists' in our study was similar to that reported by Lo and colleagues in an adult hospital (3.5 and 3.8 interruptions per hour, respectively).

Conclusion and Next Steps

First study to quantify how pharmacists in a paediatric hospital spend their time.

Results provide useful baseline data against which to measure the impact of eMMS on pharmacists' work and WOMBAT provides a robust means to collect data to make such comparisons.

Study definitions are also being used to collect pharmacists' work data in other Australian and UK hospitals. This will allow for comparison of pharmacists' work practices in different hospitals and countries.



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