

Additional file 1 Quantitative work-sampling task definitions with inclusion and exclusion examples, adapted from Schofield et al [1]. Legend: Tasks are grouped into those that are value-added and non-value-added from a patient’s perspective, based on Lean methodology, to facilitate identification of potentially ‘wasteful’ or non-value-added steps [2]. Codes listed were those used during data collection.

| Code | Task | Task definition | Inclusions and exclusions |
|-----------------------------|---------------------------------------|--|--|
| A. Value-added tasks | | | |
| Rxl | 1. Prescribing medication (Inpatient) | This involves prescribing medication for inpatient administration. | <u>Includes:</u> Writing/entering a new medication order, changing orders, and giving a verbal order for inpatient administration <u>Excludes:</u> Re-writing/re-entering orders (eg re-writing due to legibility issues, see Transc), prescribing for discharge (RxD) |
| RxD | 2. Prescribing medication (Discharge) | This involves prescribing medication and/or completing discharge information to communicate plan for a patient’s treatment at discharge. | <u>Includes:</u> Writing/entering a new medication order, changing orders, and giving a verbal order for discharge <u>Excludes:</u> Re-writing/re-entering orders (eg re-writing due to legibility issues, see Transc), writing a new inpatient medication order, changing inpatient orders, giving verbal orders for inpatient administration (Rxl). |
| Transc | 3. Transcribing medication orders | This involves transferring medication orders previously written for inpatient use | <u>Includes:</u> Copying medication orders from one medication chart/screen to a new medication chart/screen, re-writing orders following a request for clarification <u>Excludes:</u> Writing/entering a new medication order, changing orders, and giving a verbal order (Rxl for inpatient use, RxD for discharge) |
| DHx | 4. Drug history | This involves taking a drug history from a patient and/or other people/materials. Taking a drug history is one part of the medicines reconciliation process. Other parts of the medicines reconciliation are recorded separately: screening inpatient medication, searching for information, reviewing patient records, and medication discussion. | <u>Includes:</u> Speaking with a patient/carer about their drug history, going through a patients’ own drugs, contacting a health care professional to obtain a patient’s drug history, documenting the drug history <u>Excludes:</u> Discussing medications that are unrelated to the drug history with a patient/carer or health professional (DisT or DisC). Discussions with a patient/carer that are not medication-related (Care). |
| DisT | 5. Medication discussion (technical) | This involves discussing any legal requirements, clarification and/or any other non-clinical aspects of a medication order for inpatient use or discharge | <u>Includes:</u> Asking a prescriber to re-write/re-enter a drug order due to illegibility or legal reasons, asking another health professional to clarify the drug order, clarifying with a patient/carer about the drug order, telling another healthcare professional about the location of a medication (not searching) <u>Excludes:</u> Discussing a new medication order for inpatient administration or discharge (DisC), discussing drug history (DHx) |
| DisC | 6. Medication discussion (clinical) | This involves discussing any clinical aspects of a medication order for inpatient use or discharge | <u>Includes:</u> Clarifying the choice of drug or dosage, discussing side effects, discussing administration protocols, discussing drug choices (dose, frequency, compliance) with patient/relative, asking doctors to prescribe/amend medication order <u>Excludes:</u> Asking a prescriber to re-write/re-enter an illegible or incomplete order (DisT), discussing drug history (DHx) |
| H | 7. Handover | This involves reviewing a handover or documenting on a handover sheet or electronic handover | <u>Includes:</u> Documenting on handover, reviewing (viewing) handover, printing handover <u>Excludes:</u> Discussing a patient’s drugs using the handover (DisC), non medication-related communication (Comm) |
| Order | 8. Ordering medication | This involves placing/cancelling/chasing a request for medication supply | <u>Includes:</u> Making or taking a request (verbal, telephone, faxing) for medication supply, chasing medication to be supplied <u>Excludes:</u> Ordering medication from a discharge prescription (ScrD) |
| Disp | 9. Dispensing medication | This involves labeling, retrieving, dispensing and/or checking medications for supply against a medication order | <u>Includes:</u> Amending an existing label on a medication container, searching for medication, asking for a check of the medication supplied, checking the medication supplied is the same as on the medication order, clarifying medication order for dispensing <u>Excludes:</u> Ordering a medication (Order), giving out medication to a healthcare professional/patient/carer (O), telling a healthcare professional the location of the medication supplied (DisT) |
| ScrI | 10. Screening Inpatient medication | This involves clinically screen drug orders as part of planning and reviewing inpatient medication | <u>Includes:</u> Reviewing a patient’s medication for appropriateness, adding instructions to medication orders, endorsing medication orders with drug supply information for inpatient use |

| Code | Task | Task definition | Inclusions and exclusions |
|---------------------------------|---|--|---|
| | | treatment | <u>Excludes:</u> reviewing medications for discharge (ScrD), discussing medication (DisT or DisC), drug history taking (DHx) |
| ScrD | 11. Screening discharge medication | This involves clinically screen and add instructions to a patient's discharge summary | <u>Includes:</u> Adding instructions to medication orders, endorsing medication orders with drug supply information for discharge, adding or printing information to discharge summary letter <u>Excludes:</u> Reviewing medications for inpatient use (ScrI), discussing medication (DisT or DisC), drug history taking (DHx) |
| Care | 12. Helping patient/carer (non-medication related) | This involves any activity that is perceived as helping a patient by the observer. | <u>Includes:</u> Escorting a patient, communicating with patient/carer or visitor, making a patient comfortable, transporting a patient. All non-medication related communication with patient/carer is defined as direct care. <u>Excludes:</u> Medication related activities, communicating with staff member or patient regarding medications (DisT or DisC). |
| Comm | 13. Professional communication (not medication) | This involves any work-related discussion with another staff member that is not medication related | <u>Includes:</u> Requesting medical or nurse review, planning care with any health professional, handover/parts of a ward round, telephone call <u>Excludes:</u> Medication related discussion with staff member or patient/carer (DisT or DisC or DHx) |
| RevR | 14. Reviewing patient records | This involves the review and/or documentation of information held on a patient's paper or electronic medical record | <u>Includes:</u> Looking up laboratory results, patient's bedside observation records, medical notes, writing in a patient's medical notes <u>Excludes:</u> Reviewing the medication chart/screen (ScrI or ScrD), reviewing a patient's list of medications from home (DHx) |
| B. Non-value-added tasks | | | |
| SearM | 15. Searching for paper drug chart or computer | This involves searching for a medication chart/device to access medication orders that was not found in its usual location | <u>Includes:</u> Looking for medication charts with drug order, asking about the location of the paper/electronic medication order, looking for a tablet device to access the electronic medication order <u>Excludes:</u> Looking for a patient's medical notes, looking for equipment, waiting to access the medication order if someone else is using it (WaitM) |
| SearI | 16. Searching for information | This involves searching for information on different drug treatments using the computer or other resources | <u>Includes:</u> Searching information using the computer or paper-based reference resources <u>Excludes:</u> Searching for medical notes (O), asking another healthcare professional (DisT) |
| WaitM | 17. Waiting for paper drug chart/access to medication order | This involves time spent waiting to access a drug chart/electronic medication order | <u>Includes:</u> Waiting for medication charts and/or tablet device to access the electronic medication order, waiting for computer device to load medication order screen <u>Excludes:</u> Looking for a patient's medical notes (O), looking for equipment (SearM) |
| Trav | 18. Travelling | This involves time spent walking between patients and tasks. | <u>Includes:</u> Walking to answer a phone or bleep, walking to a new task <u>Excludes:</u> Travel associated with any of the pre-defined tasks in this table (Trav) |
| Edu | 19. Supervising a pre-registration pharmacist | This involves the time spent on supervising and educating a pre-registration pharmacist | <u>Includes:</u> Showing the pre-registration pharmacist how to perform a task or explaining to the student the reason behind a specific treatment |
| C. Other | | | |
| O | 20. Other | Any task that is not included in the list of pre-defined tasks in this table. | |

References

- Schofield B, Cresswell K, Westbrook J, Slee A, Girling A, Shah S, et al. The impact of electronic prescribing systems on pharmacists' time and workflow: protocol for a time-and-motion study in English NHS hospitals: Table 1. *BMJ Open*. 2015;5:e008785. doi:10.1136/bmjopen-2015-008785.
- Jones D, Mitchell A, Lean Enterprise Academy UK. Lean thinking for the NHS. London; 2006.