

Supplementary Information for Wireless Working Paper

SI1: Classification of Jobs By Priority

A "clinical review/management" task is available for all categories so additional tasks not listed here can be assigned at the discretion of the co-ordinator

RED

Critically ill/Immediate response

Early warning score (standard score based on routine observations) >4

Urgent admission

Chest pain

Fall where patient has suffered major injury or changed Glasgow Coma Scale by 2 points

Neutropenic sepsis

Acutely unwell/Urgent response

Cardiac arrest

Sudden onset of breathlessness

AMBER

Post operative bleeding

Wound dehiscence

Confused

Drug administration

ECG interpretation

GREEN

Abnormal blood results

Clerking

Certification of death

Drug prescribing

Microbiology

Cannulation

Catheterisation

Venepuncture

X ray review

IV fluids prescribing

Discharge

Assessment post fall

ECG recording

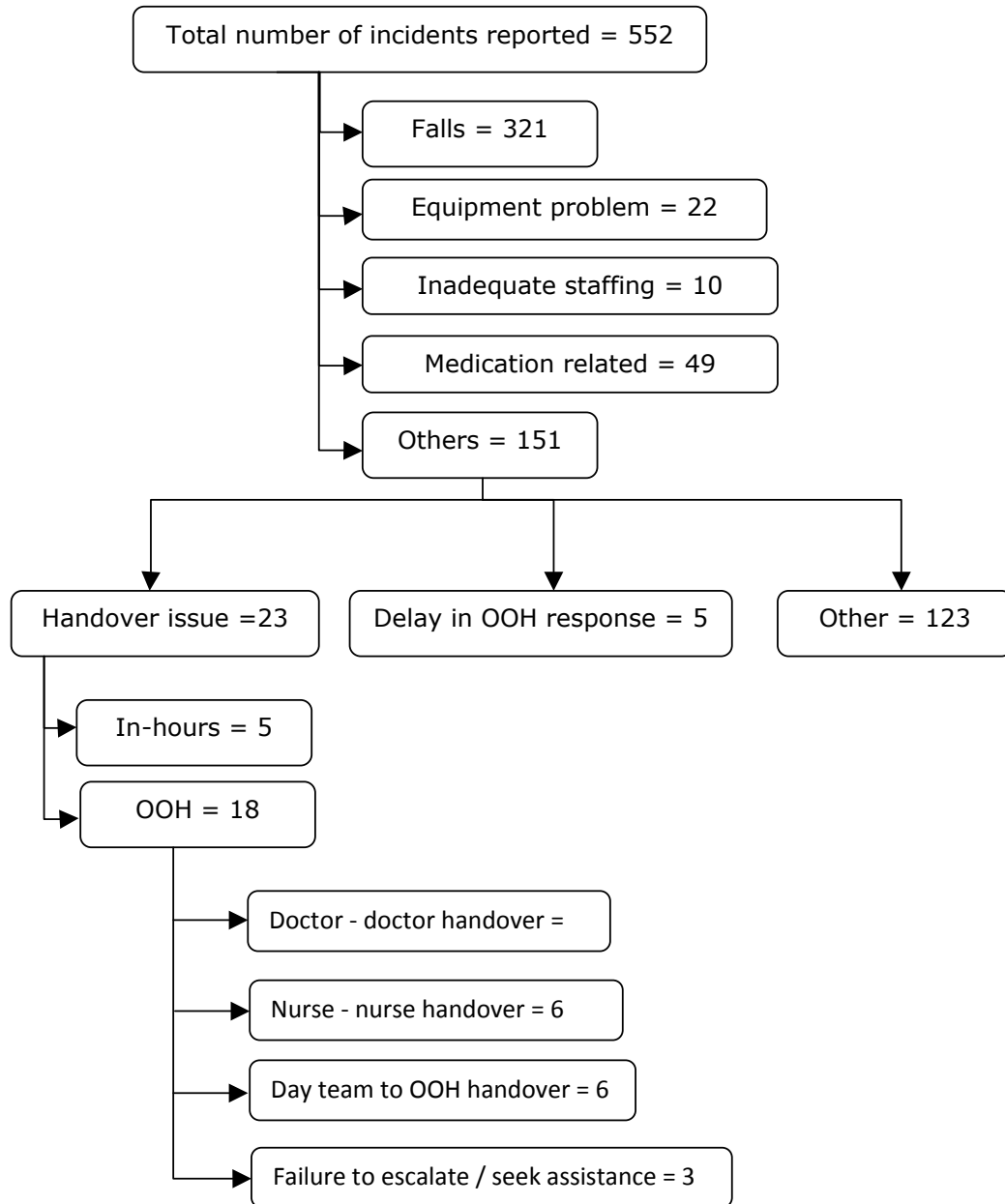
Liaison with other services

Advice to nursing/junior staff

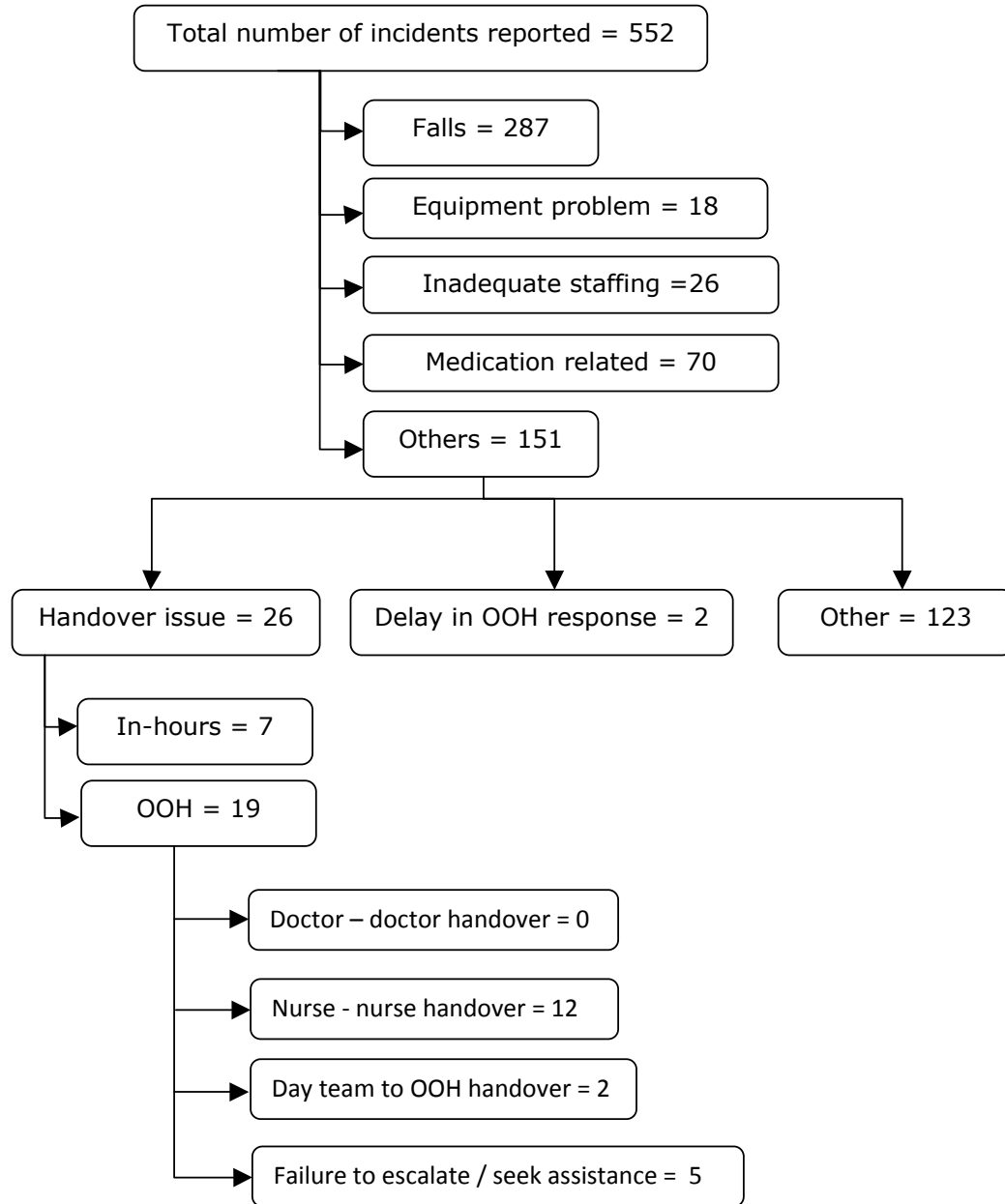
Blood results interpretation

Discussion with relatives

Supplementary Item 2: Incidents reported in the medical directorate in January and February 2011.



Supplementary item 3: Incidents reported in the medical directorate in June and July 2011.



Supplementary Item 4: Examples of Untoward Incidents Where the New H@N System Could Have Reduced Patient Risk

The following are anonymised and abbreviated accounts of clinical incidents that occurred within Nottingham University Hospitals NHS Trust before the implementation of the wireless H@N system, yet may have been prevented by its earlier uptake.

Example 1- Job allocation issue

An 80 year old lady was awaiting discharge on a Saturday having been admitted seven days previously; she was on warfarin for atrial fibrillation but initially her INR had been high following a change in her medication. The ward staff were waiting confirmation that her INR was within range, her discharge medication to be prescribed, and for her next two doses of warfarin to be dosed prior to discharge. The INR had been rechecked at 5pm and the job passed over to the H@N team to chase. The nurses bleeped the H@N coordinator at 8pm, and the coordinator allocated the job to a junior doctor. That junior doctor denied any knowledge of the task being passed on to them. It was midnight by the time the oversight was identified and addressed. Although the patient's INR was appropriate for discharge, the transport slot was missed and the patient had to spend another night in hospital.

Potential with the New System

In this situation the nurse logs the job on the ward computer. The job gets passed electronically to the coordinators tablet PC where it is allocated to the junior doctor covering that area or with the lightest job load. Once the coordinator accepts and allocates the job to the junior doctor the job is highlighted on the nurse's computer as accepted and pending. If the job is not processed by the time of the doctors' shift change the job remains live on the system, and must therefore get passed on. The job is only deleted when the junior doctor processed the job and deletes it from the phone. A record of this is kept on the nurses ward computer and the coordinators tablet PC.

Example 2- Senior Review Issue

A 35 year old patient with a complex past medical history including alcohol misuse, chronic pancreatitis, asthma and diabetes was on the gastroenterology ward recovering from an ERCP and stent insertion. The patient developed a fever and elevated heart rate, and both his blood pressure and urine output fell profoundly. The ward nurses phoned the H@N co-ordinator at 5.20pm and a F1 (first year) junior doctor arrived at 5.30pm to review the patient. The junior doctor prescribed a 1 litre of 0.9% sodium chloride solution to be given over six hours and took samples for arterial blood gas analysis and blood culture. The F1 told the nursing staff that they would discuss the case with the medical registrar in due course.

At the 10pm handover the patient was discussed with the medical registrar: they immediately attended the ward to find the patient was critically ill, and arranged an urgent transfer to a level three (intensive care) bed. Although the patient survived, they required two weeks on the intensive care unit including periods of ventilation and renal replacement therapy. This may have been avoided if initial management had been more aggressive.

Potential with the New System

The ward nurse is triggered by her concern and the patient's high early warning score to log an urgent (red) task on the ward computer. She is prompted by a pop up box on the screen to additionally speak directly to the coordinator. This task is sent electronically to the coordinator and then allocated by the coordinator to a junior doctor. As the job is marked red it is also automatically copied directly to the medical registrar's mobile phone along with the contact number of the junior doctor the job has been allocated to. The medical registrar is then aware of the patients name, diagnosis, and observations, and knows which junior doctor to discuss the case with. Consequently the medical registrar has oversight of all urgent problems occurring over a wide geographical area. He or she can speak directly to the junior doctor reviewing a patient over the wireless network via their phones to ensure an appropriate management plan is instituted promptly and decide when to review the patient themselves.