



The PHARMS Study

(Patient Held Active Record of Medication Status)

Dr Elaine Walsh
elaine.walsh@ucc.ie

A TRADITION OF
INDEPENDENT
THINKING



UCC

University College Cork, Ireland
Coláiste na hOllscoile Corcaigh

Background

- Medication errors are an important patient safety issue¹
- Errors frequently occur as patients move between hospital and the community²

1. **Walsh EK**, Hansen CR et al. Economic Impact of Medication Error: a systematic review. *Pharmacoepidemiology and Drug Safety*, 2017, DOI 10.1002/pds.4188
2. Michaelsen M, **Walsh EK**, McCague P, Bradley C, Owens R, Sahn L. Prescribing error at hospital discharge: a retrospective review of medication information in an Irish hospital. *Irish Journal of Medical Sciences*, 2017, DOI 10.1007/s11845-017-1556-5

Issues

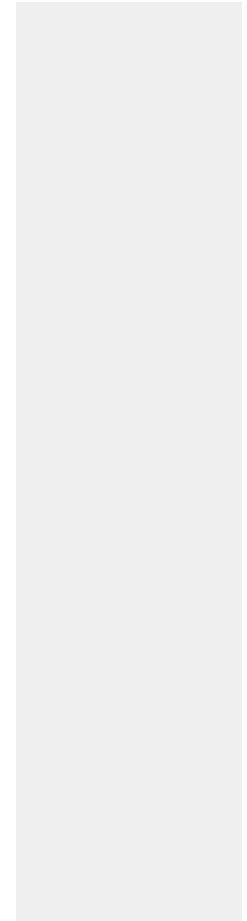
- Lack of timely communication of medication information between primary and secondary care
- Errors in medication information
- Poor patient knowledge of medication information

Intervention development

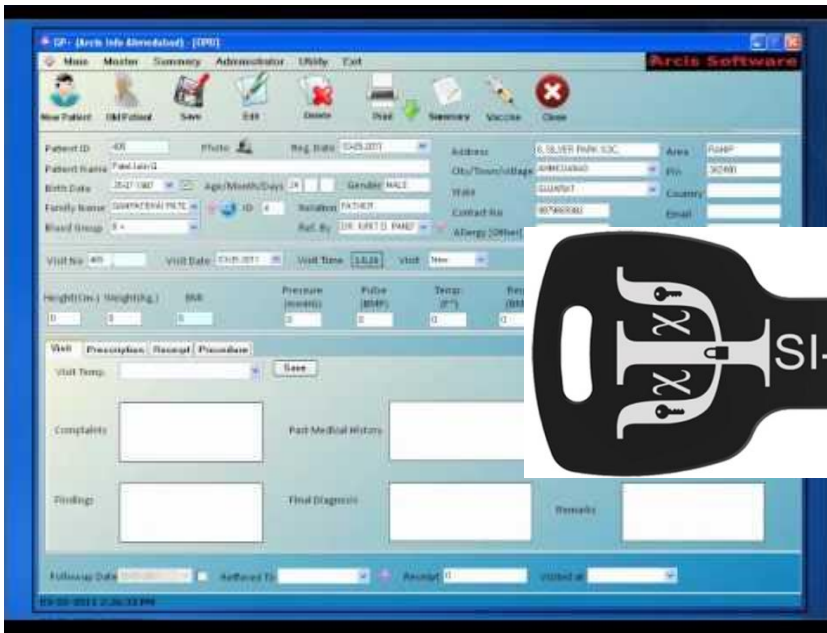
- Patient
- GP
- Information Technology (IT)

Collaboration

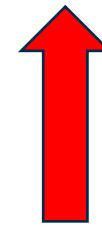
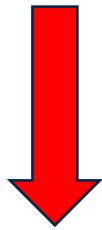
- Si-Key Ltd
- Department of General Practice, UCC
- Technology Transfer Office, UCC



PHARMS device



PHARMS device



GP



Patient

Feasibility study^{1,2}

To assess the feasibility of introducing the device at hospital discharge

- To assess the clinical impact of use of the device
- To establish acceptability to key stakeholders
- To examine the process of implementation

1. **Walsh EK**, Sahm LJ, Kearney PM, Smithson WH, Kerins DM, Ngwa C, Fitzgerald C, McCarthy S, Connolly E, Dalton K, Byrne D, Carey M, Bradley CP. The PHARMS (Patient Held Active Record of Medication Status) Feasibility study: a research proposal. BMC Research Notes 2018 DOI:10.1186/s13104-017-3118-3
2. **Walsh EK**, Sahm LJ, Bradley CP, Dalton K, O'Sullivan K, McCarthy S, Connolly E, Fitzgerald C, Smithson WH, Kerins DM, Byrne D, Kearney PM. The PHARMS (Patient Held Active Record of Medication Status) Study: a mixed methods feasibility study. BJGP 2019 DOI:10.3399/bjgp19X702413

Methods

- **Study design:** Non-randomised intervention study (intervention and control groups)
- **Study population:** Community dwelling older adult patients (>60 yrs)
- **Setting:** Medical and surgical wards of an urban university affiliated hospital
- **Study sample:** Patients attending one of 4 selected GP practices, taking 3 or more medications admitted to the hospital

Methods



Issued to participants

Retained while an inpatient

Used to generate discharge prescription

Medication information transferred electronically to GP

Methods: Device operation

1. Inserted into the USB port of the hospital computer
2. Patient's medications as they appear in the GP record reviewed by hospital doctor
3. Discharge prescription generated
4. Any alterations to medications while an inpatient noted
5. Prescription and notes automatically transmitted electronically to GP
6. Prescription and notes accessible in the 'Documents' section of the patient's GP file

Methods: Outcomes of interest

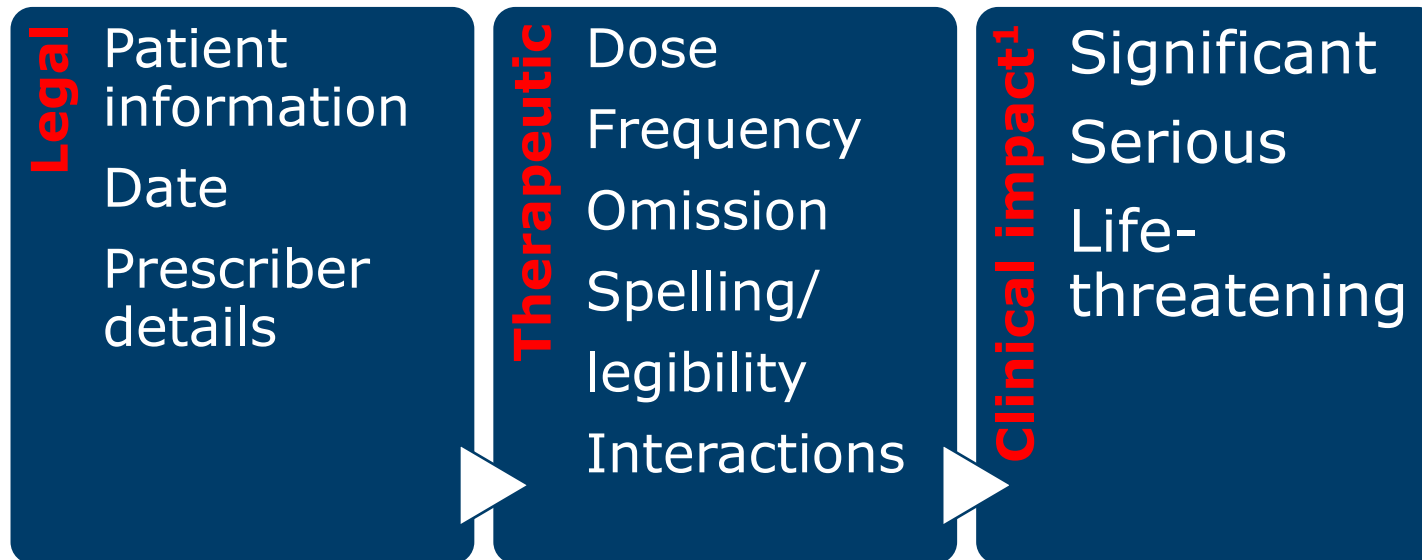
1. Clinical:

- Prevalence of prescribing error on discharge prescriptions in intervention and control arms

2. Acceptability and feasibility:

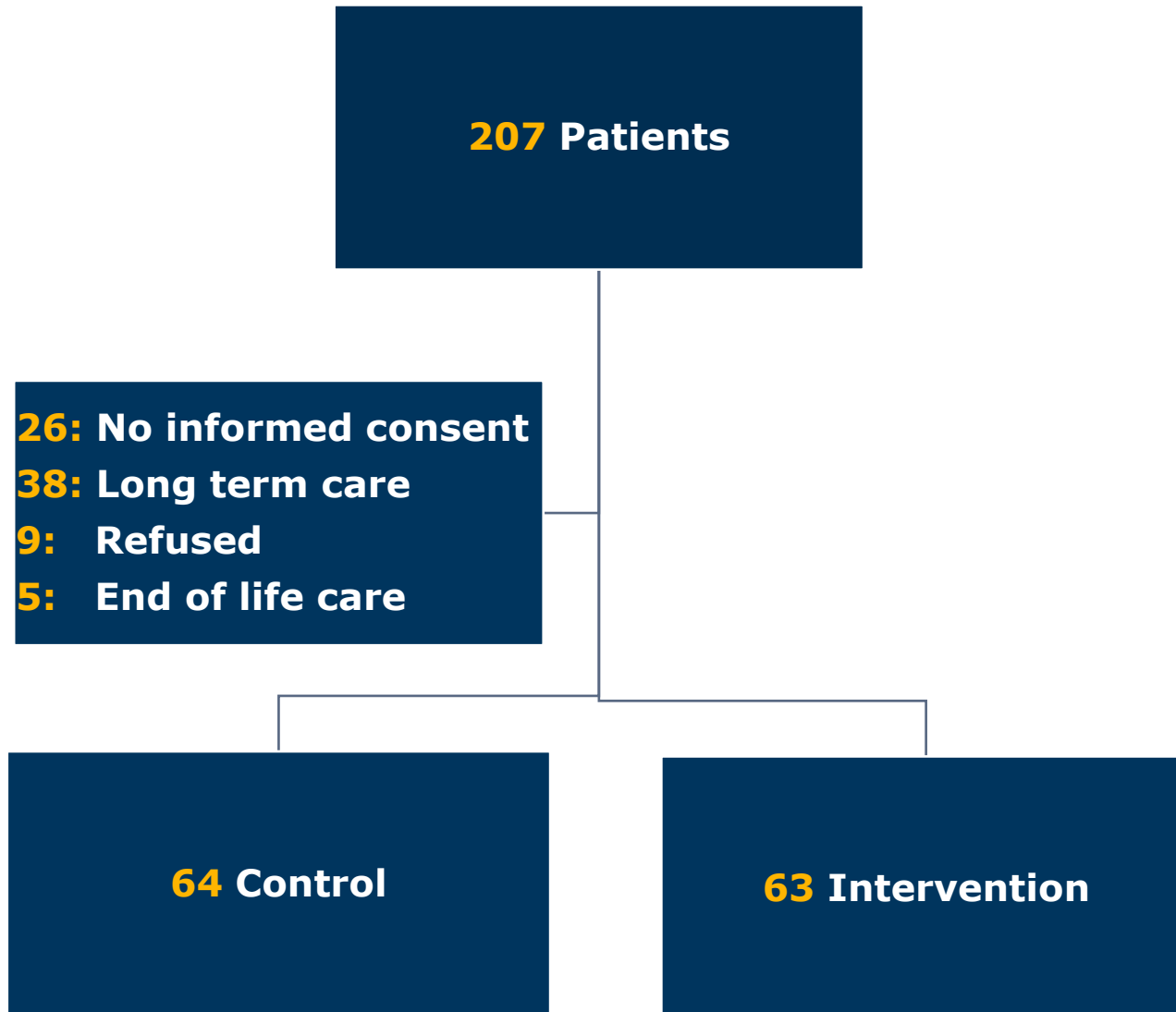
- Interviews with patients, hospital doctors, GPs, IT professionals
- Non-participant observation

Methods: Prescribing error



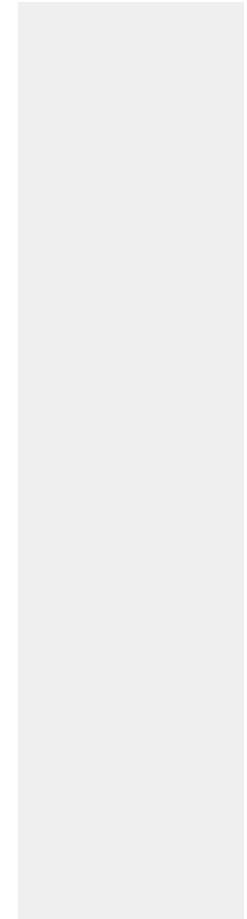
1. Pevnick JM, Nguyen C et al. Improving admission medication reconciliation with pharmacists or pharmacy technicians in the emergency department: a randomised controlled trial. *BMJ quality & safety*. 2018;27(7):512-20.

Results: Patient recruitment



Results: Patient demographics

	Intervention	Control	p Value
Gender	54% Male	62% Male	0.507 (χ^2_{Yates} 0.441*)
Mobility	59% Independent	48% Independent	0.375 (χ^2_{Yates} 0.788*)
Dressing	76% Independent	67% Independent	0.490 (χ^2_{Yates} 0.477*)
Contenance	78% Continent	91% Continent	0.092 (χ^2_{Yates} 2.842*)
Feeding	93% Independent	84% Independent	0.296 (χ^2_{Yates} 1.092*)
Socioeconomic status	83% Public	71% Public	0.231 (χ^2_{Yates} 1.092*)
Age	72.59 Mean (6.17 SD)	77.38 Mean (7.27 SD)	0.01 (t 3.46, df 1)
Length of stay	6 Median (3,10 IQR)	6 Median (5,13 IQR)	0.207 (Mann Whitney U)
Meds on admission	10 Median (8,15 IQR)	10 Median (7,13 IQR)	0.248 (Mann Whitney U)



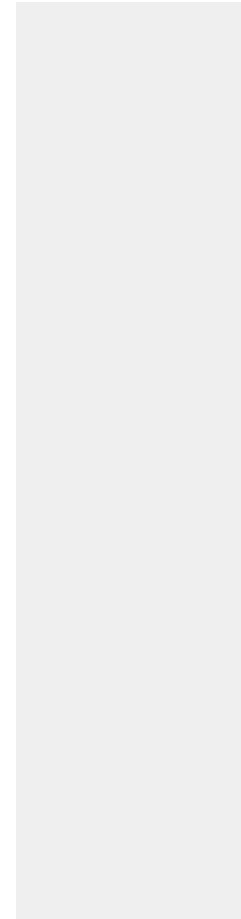
Results: Prescribing error

Error number:

	Intervention	Control	p Value
Error number	1 Median (0,3 IQR)	8 Median (4,13.5 IQR)	<0.001 (Mann Whitney U)

Comparison of error types

Type of Error	Control (n=61)		Intervention (n=41)		p Value
	n	%	n	%	
Patient Information	2	3.3%	0	0%	0.514
Date	5	8.2%	0	0%	0.08
Legibility/Spelling	5	8.2%	0	0%	0.08
Quantity/Duration	22	36.1%	0	0%	<0.001
Prescriber Information	18	29.5%	0	0%	<0.001
Drug Interaction	26	42.6%	16	39%	0.838
Frequency	2	3.3%	3	7.3%	1.00
Dose	7	11.5%	4	9.8%	1.00
Medication Omission	46	75.4%	17	41.5%	0.001



Results: Prescribing error

Clinical significance:

	Intervention	Control	p Value
Score	2 Median (0,4 IQR)	11 Median (5,20 IQR)	<0.001 (Mann Whitney U)

Results: Feasibility

Introduction in both primary and secondary care **is** feasible

Results: Feasibility

63 Devices deployed

- 3:** Hospital firewall
- 3:** GP server
- 4:** Hospital hardware
- 3:** Patient transfer
- 9:** Not used

41 Successful transmissions

Results: Acceptability

GPs (n=8):

- Advantage over paper-based system:
 - Accessible
 - Immediate
 - Higher quality
- Difficulty with deviation from usual practice:
 - Uncertainty re operation
- User dependent

If everyone was doing it we'd have, I suppose, solid prescriptions - we'd know what patients were really on

Results: Acceptability

Junior doctors (n=13):

I'm sure it would be fine if it were the primary method for every single patient....but when you're writing prescriptions all day, you just forget about it

- User friendly
- Useful:
 - More useful at admission
- Difficulty with deviation from usual practice:
 - Additional workload
 - Forgetting to use device
 - Inadequate hospital computer hardware
- Preference for electronic system

Results: Acceptability

Patients (n=12):

- Acceptable
 - Concept
 - Technology
- Difficulty in understanding mechanism of action of device
- Difficulty in retaining device as an inpatient

When a doctor's in front of you, you lose concentration and you can't remember the names...with the key it would be better.

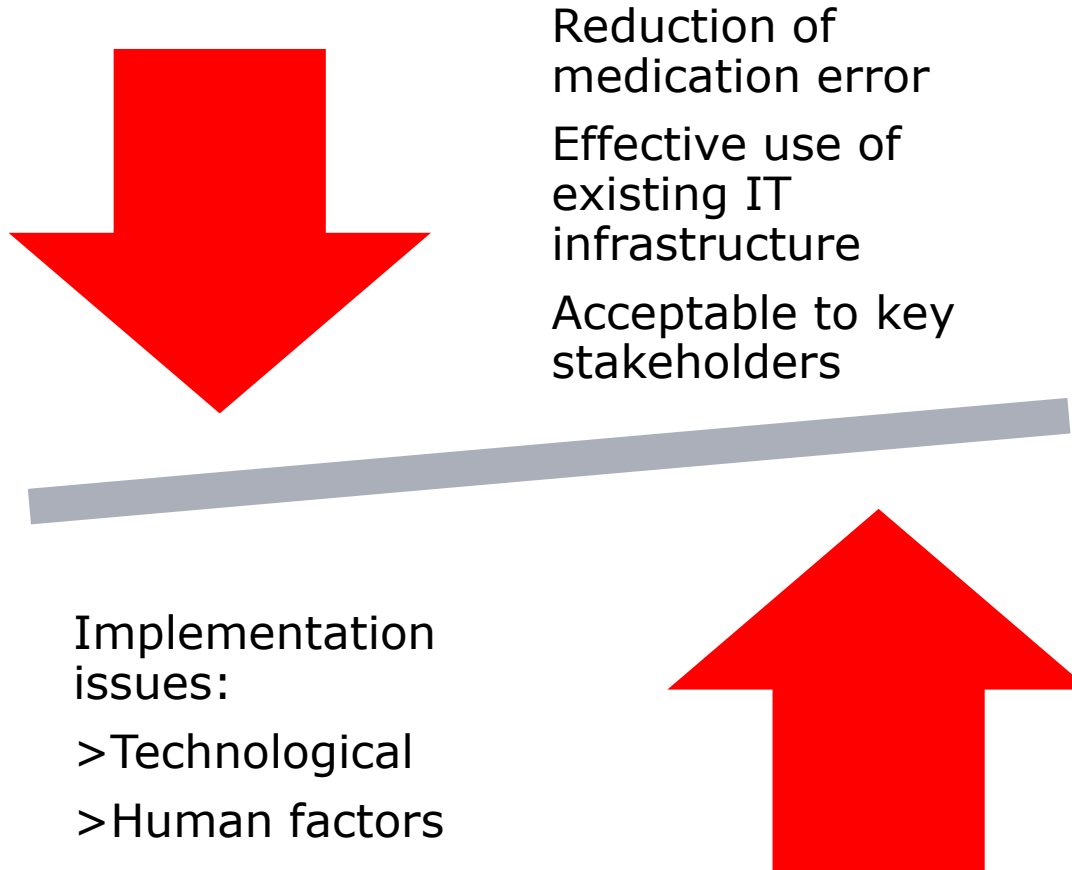
Results: Acceptability

[We] learned a lot and we now know how the system works so implementing it again here going forward would not be a problem but it's just a learning experience really with projects like this.

IT professionals (n=2):

- Issues pertaining to device
 - Early stage
 - Communication with developer
- Integration into existing IT system
 - Security issues
 - Hardware issues
- Acceptable technology

Conclusions



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Contact

**Elaine Walsh,
Department of General Practice,
University College Cork.**

elaine.walsh@ucc.ie

