# The Discharge Assistant: Facilitating Information Transfer at Hospital Discharge

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# Adverse events are common when patients transition from hospital to outpatient care[1]

- **19-23% of patients experience adverse events within 4 weeks after acute care hospitalization**
- **Ineffective communication contributed to many of the preventable adverse events**
- **Discharge communication should include specific information:**
  - **The new discharge medication regimen**
  - **What follow-up physicians need to do**
  - **When they need to do it**
  - **What they should watch for**
  - ***And* more effort must be made to effectively communicate this information to the patient**

1. Forster AJ, et al. The incidence and severity of adverse events affecting patients after discharge from the hospital, Ann Intern Med. 3 (2003) 161-167.

# Miscommunication about Medications is a Common Cause of Many Adverse Events

**66% of adverse events identified by Forster, et al. were adverse drug events[1]**

**Following hospital discharge[2]:**

- **64% of elderly patients have at least one medicine not ordered by the discharging physician**
- **73% of patients fail to use at least one medicine as directed**
- **32% of drugs ordered at discharge are not used by the patient**

**Integration of admission medications, in-hospital changes, and discharge medications on a single form increases the conformity rates of community pharmacy patient profiles after hospitalization[3]**

1. Forster AJ, et al. The incidence and severity of adverse events affecting patients after discharge from the hospital, Ann Intern Med. 3 (2003) 161-167.
2. Beers MH, et al. Compliance with medication orders among the elderly after hospital discharge, Hosp Formul. 7 (1992) 720-724.
3. Paguette-Lamontagne, et al. Evaluation of a new integrated discharge prescription form. Ann Pharmacother 2001;35(7-8):953-8.

# The most common form of information transfer is the structured discharge summary[1,2]

**Information is not received in a timely fashion…**

- arrive, on average, 2-4 weeks after hospital discharge
- 66-92% of patients visit their outpatient physicians before complete discharge information is available
- Between 16 and 53% of patients contact their outpatient physician before arrival of any discharge information

**…and for 51% of patients, the discharge summary is *never sent* to the follow-up physician**

***When discharge communication is delayed or insufficiently detailed, post-discharge management is adversely affected for 10-14% of patients***

1. Kripalani S., et al. Deficits in information transfer from inpatient to outpatient physicians at hospital discharge: a systematic review [abstract], *J Gen Intern Med.* 19 (2004) (suppl 1) 135.
2. van Walraven C, et al. Dissemination of discharge summaries. Not reaching follow-up physicians, *Can Fam Physician*. 48 (2002) 737-742.

# Immediate Discharge Documents[1]

**Facilitated timely communication…**

- 60% were received within 5 days

**…but information was often incomplete**

- 13% omitted a main diagnosis or condition
- Only 28% had clear F/U plans
- Only 12% stated whether further test results were pending
- 41% specified who to contact if further information was needed

*and the signature was legible in only 39%*

1. Foster DS, Paterson C, Fairfield G. Evaluation of immediate discharge documents – room for improvment? Scott Med J. 2002;47(4):77-9.

UTS DISCHARGE MEDICINE
PREPRINTED ORDERS
Form No. 113-2242 (Rev. 07/04)
Page 1 of 2

| Height: | Weight: | PHYSICIANS ORDERS<br>UTS DISCHARGE MEDICINE |
|---|---|---|

**DISCONTINUED MEDICATION**

Discharge Nursing Unit _____

**DO NOT take these medications after discharge home. (List medications only – Please include Generic & Brand names.**

**New Allergies Documented this hospital stay**

_____

_____

_____

_____

**ATTENTION PHARMACIST – NEW MEDICATION – PLEASE FILL**

| Med | Dose | Frequency | Quantity | Refills | Do Not Subs. | Subs. |
|---|---|---|---|---|---|---|
| | | | | | ☐ | ☐ |
| | | | | | ☐ | ☐ |
| | | | | | ☐ | ☐ |
| | | | | | ☐ | ☐ |
| | | | | | ☐ | ☐ |

**ATTENTION PHARMACIST–PREVIOUS MEDICATION CHANGED DOSE/FREQUENCY–INFORMATION ONLY**
**Outpatient medications to be continued at CHANGED dose and/or frequency – no script needed or a controlled substance for which patient should have separate written script.**

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |

**ATTENTION PHARMACIST – UNCHANGED DOSE/FREQUENCY – INFORMATION ONLY**
**OUTPATIENT MEDICATIONS TO BE CONTINUED UNCHANGED AT DISCHARGE.**

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Physician Signature _____ ID# _____ DEA # _____
Print Name _____
Date _____ OSF Saint Francis Medical Center Pharmacy (309) 655-2285

Faxed to primary care provider and other physicians with follow up appts. _____ Initials

White copy given to patient to take to pharmacy _____ Nurse Initials
Controlled substances need SEPARATE PRESCRIPTION

**PHYSICIANS ORDERS** **PATIENT COPY**

UTS DISCHARGE MEDICINE
PREPRINTED ORDERS
Form No. 113-2242 (Rev. 07/04)
Page 2 of 2

| Height: | Weight: | PHYSICIANS ORDERS<br>UTS DISCHARGE MEDICINE |
|---|---|---|

**Active Discharge Diagnosis:** **Date of Discharge:**_____

_____

_____

_____

_____

_____

**Follow Up Tests / Labs / Appointments:**

| Test / Appt. | Scheduled Date / Time / Place | To be scheduled by Outpatient Physician |
|---|---|---|
| | | ☐ |
| | | ☐ |
| | | ☐ |
| | | ☐ |

| Physician / Provider | Appointment Date / Time | Office# | Patient Must Call & Schedule |
|---|---|---|---|
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |

**Code Status at discharge:** ☐ Resuscitate ☐ Do not resuscitate ☐ Not Discussed

**Diet Restriction:** _____
**Return to Work:** _____
**Activity Restriction:** _____
**Other:** _____
_____

**Signature of Discharge Physician:** _____
**Name:** _____ **ID #** _____ **Date:** _____

**DO NOT INITIATE ORDERS UNTIL SIGNED**
*Fax to Outpatient Physicians Listed _____ Initials*
*Yellow Copy to Patient _____ Nurse Initials*

**PHYSICIANS ORDERS** **PATIENT COPY**

# Current Process

Discharging Physician

Clerk

Patient

PCP (+/- Consultants)

[redacted]

UTS DISCHARGE MEDICINE
PREPRINTED ORDERS
Form No. 113-2242 (Rev. 07/04)
Page 1 of 2

Height: | Weight:

PHYSICIANS ORDERS
UTS DISCHARGE MEDICINE

DISCONTINUED MEDICATION

Discharge Nursing Unit 3700

DO NOT take these medications after discharge home. (List medications only – Please include Generic & Brand names.

New Allergies Documented this hospital stay

ATTENTION PHARMACIST – NEW MEDICATION – PLEASE FILL

| Med | Dose | Frequency | Quantity | Refills | Do Not Subs. | Subs. |
|---|---|---|---|---|---|---|
| albuterol inhaler inh | 90 mcg | 2 puffs q6h prn | #1 | 2 | ☐ | ☐ |
| ~~thiamine po~~ | ~~100 mg~~ | ~~q day~~ | ~~#30~~ | ~~2~~ | ☐ | ☐ |
| multivitamin po | 1 tab | q day | #30 | 2 | ☐ | ☐ |
| ~~folic acid~~ | | | | | ☐ | ☐ |
| | | | | | ☐ | ☐ |

ATTENTION PHARMACIST–PREVIOUS MEDICATION CHANGED DOSE/FREQUENCY–INFORMATION ONLY
Outpatient medications to be continued at CHANGED dose and/or frequency -- no script needed or a controlled substance for which patient should have separate written script.

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |

ATTENTION PHARMACIST -- UNCHANGED DOSE/FREQUENCY – INFORMATION ONLY
OUTPATIENT MEDICATIONS TO BE CONTINUED UNCHANGED AT DISCHARGE.

| Med | Dose | Frequency |
|---|---|---|
| albuterol inhaler | 90 mcg | 2 puffs q6h prn |
| | | |
| | | |
| | | |
| | | |
| | | |

| Med | Dose | Frequency |
|---|---|---|
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Physician Signature [redacted] ID# [redacted] DEA # _____
Print Name [redacted]
Date [redacted] OSF Saint Francis Medical Center Pharmacy (309) 655-2285

Faxed to primary care provider and other physicians with follow up appts. _____ Initials

White copy given to patient to take to pharmacy MAC Emedsfillok@medipark pharmacy
Controlled substances need SEPARATE PRESCRIPTION
Nurse Initials

PHYSICIANS ORDERS PATIENT COPY

[redacted]

UTS DISCHARGE MEDICINE
PREPRINTED ORDERS
Form No. 113-2242 (Rev. 07/04)
Page 2 of 2

Height: | Weight:

PHYSICIANS ORDERS
UTS DISCHARGE MEDICINE

Active Discharge Diagnosis:
Pancreatitis
COPD
EtOH intoxication

Date of Discharge: [redacted]

Follow Up Tests / Labs / Appointments:

| Test / Appt. | Scheduled Date / Time / Place | To be scheduled by Outpatient Physician |
|---|---|---|
| | | ☐ |
| | | ☐ |
| | | ☐ |
| | | ☐ |

| Physician / Provider | Appointment Date / Time | Office# | Patient Must Call & Schedule |
|---|---|---|---|
| AIM Clinic | | | ☐ |
| | | | ☐ |
| | | | ☐ |
| | | | ☐ |

Code Status at discharge: ☑ Resuscitate ☐ Do not resuscitate ☐ Not Discussed

Diet Restriction: ~~as tolerated~~ none
Return to Work: N/A
Activity Restriction: as tolerated
Other:

Signature of Discharge Physician: [redacted]
Name: [redacted] ID # [redacted] Date: [redacted]

DO NOT INITIATE ORDERS UNTIL SIGNED
Fax to Outpatient Physicians Listed _____ Initials
Yellow Copy to Patient MAC Nurse Initials

PHYSICIANS ORDERS PATIENT COPY

[redacted] /600

# The Challenge

**Use an evidence-based approach to redesign our current process to facilitate information transfer between providers at the time of hospital discharge in a more reliable, legible, complete, and timely fashion**

# Application Requirements

- immediate utility,
- minimal development and deployment costs,
- acceptable to users and readily modifiable based on user feedback,
- support quality and educational assessment audits, and
- might assist in the identification of additional functions and features desirable in this and other discharge software applications.

# Design Specifications

**Creation of legible documents including:**

- Prescriptions for medications, diet, activity, and self-care behaviors
- Instructions for patients about followup diagnostic tests and appointments, including dates and addresses
- Correspondence to outpatient physicians which would contain all pertinent information necessary for follow-up care

**Use of prompts and basic error checks to improve the completeness and quality of the documents**

**Emphasize speed of data entry and ease of use by:**

- Minimizing text entry by making extensive use of drop-down menus, option boxes and check boxes
- Designing logically presented screens which conformed as much as possible to currently used forms and workflow patterns
- Designing search algorithms which would allow flexible yet efficient lookups.

Logged in as Doogie Howser, M.D.

1. Patient Info | 2. Diagnoses | 3. Medications | 4. Instructions | 5. Follow-up Appts. | 6. Notes, etc.

OPTIONAL:
This section can be used for additional information which should be communicated to the referring physician prior to receipt of the discharge summary (e.g., STUDIES PENDING AT THE TIME OF DISCHARGE, PERTINENT PROCEDURES, STUDIES, AND RESULTS, etc.). Additions to this section are intended for the referring physician only and will not be included in instructions to patients. Since this information will be included verbatim in a letter to the referring physician, please USE COMPLETE SENTENCES AND PROPER SPELLING AND GRAMMAR. (This field will be checked for misspellings prior to printing.)

Patient presented with chest pain. MI was ruled out and stress echo showed no evidence of ischemia. Ejection fraction was 40%. It was felt that GERD was the likely etiology.

Designate all doctors who shared PRIMARY responsibility for this patient's care during this hospitalization

Residents:

Add-->

<-- Remove

Residents who cared for patient:

Consultants: Add New

Add-->

<-- Remove

Consultants who cared for patient*:

Harvey, RD (Internal Medicine-Hospitalist)

*A summary will be sent to each consulting physician.

Send additional copy to... OK

Additional copies will be sent to:

Click here when finished to print documents | Preview Reports | Save for completion later | DELETE record and exit

John J Doe
(DOB: 11/11/1922)

**UHATS Discharge Medicine Prescription** Page 1 of 1

*NEW DRUG ALLERGIES IDENTIFIED THIS ADMISSION: NO NEW DRUG ALLERGIES IDENTIFIED DURING THIS ADMISSION*

**ATTENTION PHARMACIST - PLEASE FILL THE FOLLOWING PRESCRIPTIONS:**

PANTOPRAZOLE SODIUM (PROTONIX®) EQ 40MG BASE TABLET, DELAYED RELEASE
Disp: #30 with 1 refill (generic substitution allowed)
Sig: One by mouth each day
*(Note to pharmacist: this is a NEW PRESCRIPTION.)*

SULFAMETHOXAZOLE; TRIMETHOPRIM (BACTRIM DS®) 800MG;160MG TABLET
Disp: #20 with 0 refills (generic substitution allowed)
Sig: One by mouth twice daily
*(Note to pharmacist: this is a NEW PRESCRIPTION.)*

CARVEDILOL (COREG®) 6.25MG TABLET
Disp: #60 with 3 refills (generic substitution allowed)
Sig: One by mouth twice daily
*(Note to pharmacist: this is a currently prescribed medication with CHANGE IN DOSE &/OR FREQUENCY.)*

**ATTENTION PHARMACIST - The following medications are to be DISCONTINUED:**

MAALOX SUSPENSION
*(Note to pharmacist: this medication is to be DISCONTINUED.)*

Physician Signature _____ DEA # XX123456 Date: 10/22/2005
Doogie Howser, M.D. (phone: 309-655-7257)

*Informational*

*Specifies action required*

OSF Saint Francis Medical Center - Peoria

John J Doe
(DOB: 11/11/1922)

UHATS Discharge Orders Page 1 of 2

Date of Discharge: 10/21/2005

1. Discharge patient.

2. Please include the following medication information on the Medication Discharge Instructions/Transfer Order form (Form No. 113-1651)

*New allergies noted this hospitalization: NO NEW DRUG ALLERGIES IDENTIFIED DURING THIS ADMISSION*

DISCHARGE MEDICATIONS:

NEW Medications

PANTOPRAZOLE SODIUM (PROTONIX®) eq 40mg base tablet, delayed release. One by mouth each day. Disp: #30 with 1 refill (generic substitution allowed)
SULFAMETHOXAZOLE; TRIMETHOPRIM (BACTRIM DS®) 800mg;160mg tablet. One by mouth twice daily. Disp: #20 with 0 refills (generic substitution allowed)

Previous medications with CHANGES IN DOSE &/OR FREQUENCY

CARVEDILOL (COREG®) 6.25mg tablet. One by mouth twice daily. Disp: #60 with 3 refills (generic substitution allowed)

DISCONTINUED medications

MAALOX suspension

3. Provide a copy of the following information to the patient at discharge:

INSTRUCTIONS:

Diet: low fat.
Use home oxygen at 2 liters per min continually. NEVER USE OXYGEN NEAR AN OPEN FLAME.
Return to work in one week.

FOLLOW-UP APPOINTMENTS:

When: 2 weeks (is to be scheduled by patient)
Sara Rusch MD
OSF Saint Francis Medical Center
530 NE Glen Oak Ave
Peoria, IL 61637
@309)655-2730

FOLLOW-UP STUDIES:

Physician Signature _____ ID # _____ Date:_____
Doogie Howser, M.D.

DO NOT INITIATE ORDERS UNTIL SIGNED

**PHYSICIANS ORDERS**

University of Illinois
College of Medicine at Peoria

OSF Saint Francis Medical Center

Department of Medicine
Saint Francis Medical Center
530 N.E. Glen Oak Avenue
Peoria, Illinois 61637-3001

G. Stephen Nace, M.D.
*Assistant Professor of Clinical Medicine*

October 22, 2005

Sara L. Rusch, MD
530 NE Glen Oak Ave
Peoria, IL 61637

Re: John J Doe (DOB: 11/11/1922)

Dear Dr. Rusch:

Your patient John J Doe was admitted to OSF Saint Francis Medical Center on 10/14/2005, and was discharged from the University Hospitalist and Teaching Service on 10/21/2005. The following is a brief summary of the primary diagnoses, medication changes, and discharge instructions pertinent to this hospitalization:

DISCHARGE DIAGNOSES:

Chest pain, unspec. (7865O)
Hyperlipidemia NOS (2724)
Hypertension, benign (4011)

NEW MEDICATION ALLERGIES IDENTIFIED THIS ADMISSION:

NO NEW DRUG ALLERGIES IDENTIFIED DURING THIS ADMISSION

DISCHARGE MEDICATIONS:

NEW Medications

PANTOPRAZOLE SODIUM (PROTONIX®) eq 40mg base tablet, delayed release One by mouth each day Disp: #30 with 1 refill (generic substitution allowed)

SULFAMETHOXAZOLE; TRIMETHOPRIM (BACTRIM DS®) 800mg;160mg tablet One by mouth twice daily Disp: #20 with 0 refills (generic substitution allowed)

Previous medications with CHANGES IN DOSE &/OR FREQUENCY

CARVEDILOL (COREG®) 6.25mg tablet One by mouth twice daily Disp: #60 with 3 refills (generic substitution allowed)

DISCONTINUED medications

MAALOX suspension

**OSF Saint Francis Medical Center** - Peoria

**Date of Discharge: 10/21/2005**

## Instructions and Appointments for John J Doe (DOB: 11/11/1922)

INSTRUCTIONS:

Diet: low fat.
Use home oxygen at 2 liters per min continually. NEVER USE OXYGEN NEAR AN OPEN FLAME.
Return to work in one week

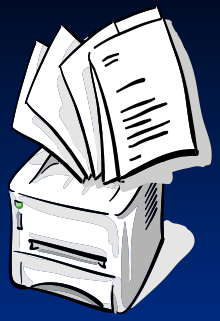
FOLLOW-UP APPOINTMENTS:

When: 2 weeks (is to be scheduled by patient)
Sara Rusch MD
OSF Saint Francis Medical Center
530 NE Glen Oak Ave
Peoria, IL 61637
(309)655-2730

FOLLOW-UP STUDIES:

BLOOD WORK 2 weeks at outpatient physician's office (is to be scheduled by patient)

# Distribution



Printer

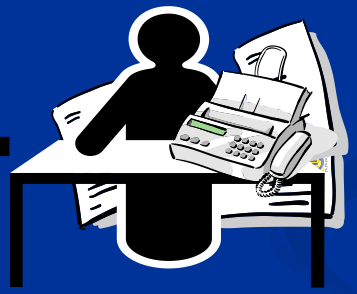
Patient

Rx and F/U instructions to patient

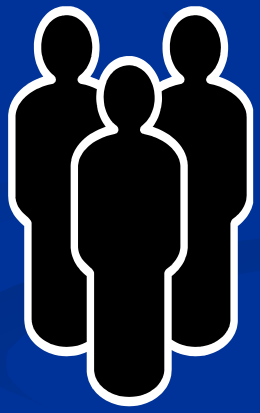
Copies printed and filed in patient chart at discharge

Discharging physician

Backend server



Secretary



PCP and Consultants

Attending proofreads summary letter

Attending Physician

# Time Study – Initial Results

- **Discharges N = 358**
- **Population [mean (ranges)]:**
  - **LOS = 5.1 days (1, 58)**
  - **# of diagnoses = 7.6 (1, 25)**
  - **# of medication directions* = 9.8 (1, 34)**
  - **words of free text entered = 99 (0, 592)**
- **Users N = 25**
  - **23 residents, 2 attendings**
- ***Median time per discharge = 36 minutes (9, 209)***

* Includes new rx's, changes in existing medications, medications from before admission which are to be continued without change, and discontinued medications

# What Have We Learned So Far?

- The new process results in information transfer which is:
  - More reliable,
  - More legible,
  - More timely, and
  - More complete.
- Referring physicians like the new process.
- Output is helpful to have with early re-admissions.
- Discharging residents are mixed in their reviews:
  - Major complaint is that it takes too much time...
  - ...but they like it when they are on the receiving end

# Vision

- Alternate reference databases (e.g., SNOMED, NDC)
- Alternate distribution mechanism (fax server +/- secure email)
- Incentives for use (e.g., substitute for a dictated summary)
- Web-based platform
- Integration with EHR
- Incorporation within EHR

# Acknowledgements


- James F. Graumlich, M.D.
- Nancy Novotny, R.N., M.S.N.
- Jean Aldag, Ph.D.
- Howard S. Cohen, M.D.
- John Whittington, M.D.
- Sara L. Rusch, M.D.
- OSF-Saint Francis Medical Center, Peoria, Illinois

*This project was supported by grant number 5 R01 HS015084 from the Agency for Healthcare Research and Quality.*