CaseFinders: Using Clinical Alerts to Build a Safety Net

Richard Kremsdorf MD, Five Rights Consulting, San Diego CA; Perry Gee RN MS, Catholic healthcare West--Northern California, Redding CA; Richard Tayrien DO, Catholic Healthcare West--Southwest, Phoenix AZ; Evelyn Smith RN, Palomar-Pomerado Health System, Escondido CA; Margaret Avery-Sijgers RN, Birmingham AL

The Problem:
When hospitalized patients decompensate, it can often be seen in retrospect that they had been losing ground for hours. If their conditions could be identified earlier, altered therapy might avert the collapse or minimize its impact. In addition, staff in supervisorial roles such as charge nurses, house nursing supervisors, and respiratory care supervisors may have difficulty identifying those patients for whom their intervention would be beneficial. Instead, they may spend the day working on routine issues and responding to catastrophes. A methodology to facilitate earlier intervention was sought.

The Context:
Scripps Mercy Hospital in San Diego California is a 500-bed community teaching hospital which implemented the 3M HELP © clinical information system in 1991. Most important clinical information is on-line and bedside computers are in use for data entry. In particular, the "Bedside Numbers" (i.e. vital signs, intake and output, and point of care testing) and Medication Charting information are on-line throughout the med-surg units. In addition, extensive alerting is in place for hands-on caregivers for issues such as critical lab values, drug-lab interactions, drug-route conversion, and adverse drug event identification.

The Innovation:
The Clinical Information Systems staff met with supervisorial staff to articulate the types of patients who warranted special evaluation and to enumerate the clinical data that would be available in HELP and could be used to identify them. Reports were created for supervisorial staff that list those patients and the data that described their situation, for example, an elevated heart rate or positive fluid balance > 2 liters. The supervisor would then personally evaluate the sickest appearing patients—often triggering administration of medications, changes in staffing assignments, or transfer of the patient to a higher level of care.

Based on debriefing of Respiratory and Nursing Supervisors, about 7 patients per day received interventions that were thought to have shortened the length of stay or prevented ICU transfer in a facility with an average daily census of about 250. Estimated, but not proven, cost savings are in the millions of dollars.

CaseFinders were developed at Mercy Medical Center in Redding, California to identify patients at risk for decubiti who then received more frequent mobilization by a special team. At St. Joseph's Hospital in Phoenix, Arizona, CaseFinders were developed to identify patients who would benefit from social services and case management referrals. Sample reports from all three settings will be shown.

Lessons Learned:
- CaseFinders can help identify large numbers of patients who benefit from having a safety net.
- Supervisorial staff need clinical information systems tools that allow them to identify trouble spots so they may provide effective supervision. Hands-on caregivers are task-oriented and are often overwhelmed with those patient care tasks, hindering their ability to identify and respond to clinical deterioration.
- The availability of the Bedside Numbers enables a huge improvement in clinical care because they are objective and actionable. Such utility suggests they should be the first component of Clinical Documentation implemented.
- In addition to retrospectively describing outcomes, Quality Improvement can become proactive by using information technology tools to intervene concurrently as a problem is developing.

Decompensating patients can have unmet needs due to mis-matches in staffing and expertise. Hands-on caregivers can be overwhelmed with their tasks and lack sufficient time and perspective to recognize and respond to rapidly changing clinical situations.

Staff in supervisorial roles, who are expected to assist in resolving such situations, need tools to identify where such mis-matches have developed. Casefinders assist supervisorial staff in learning where to focus their attention.

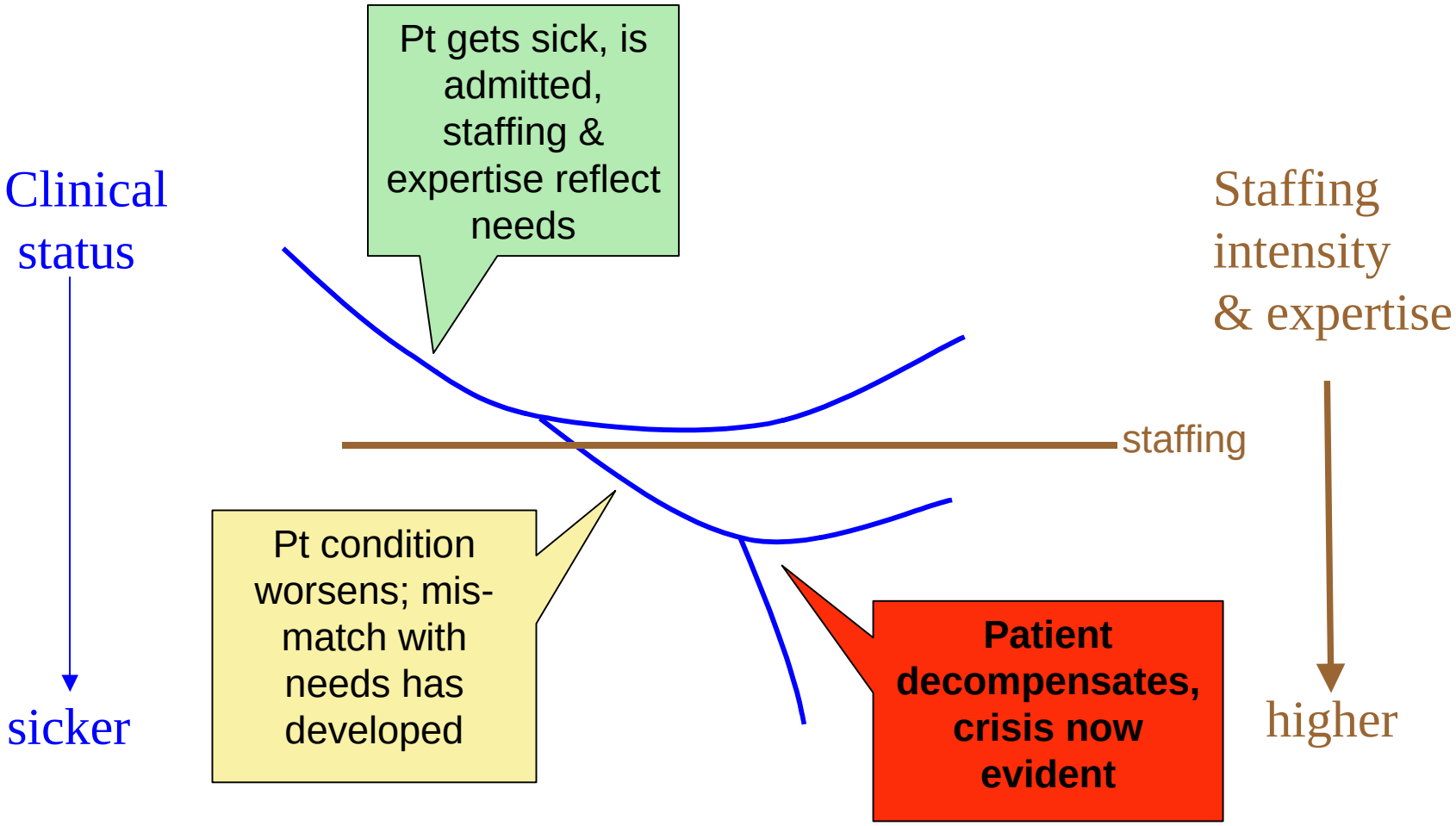
Casefinders

- Definition: *Contemporaneous* reports that identify *patients* whose *specific parameters* are outside an expected range and which are used to guide some form of *intervention* in patient care

Rationale for Casefinders

	Caregiver	**Supervisor**
Focus	•Individual	•Group
Activity	•Clinical care delivery and documentation	•Resource management
Scope	•All tasks	•Exceptions
Assistance needed from Tools	•Complete Tasks	•Summarize group status •Identify problems

How Catastrophes Develop



Casefinding

Before

- Walk to patient care area
- Find charge nurse
- Debrief
- Repeat
- Respond to code blue from different floor

After

- Run Casefinder report
- Select patients to evaluate further
- Walk to selected patient care areas
- Evaluate patient with nurse and charge nurse

Casefinder Strengths

- Focuses attention on patients for whom it matters
- Requires small amount of organizational change to implement
- Optimizes value of data already being gathered
- Should be low cost if a clinical information system is already in place

Operations Supervisor Casefinder

Scripps Mercy Hospital in San Diego noted that supervisorial staff were often called to the scene of a crisis and yet spent most of their day engaged in routine activities.

A Casefinder was developed to identify unstable patients, in whom early intervention might result in avoidance of a crisis and a better clinical outcome.

Interventions include altering staffing ratios, discussing the clinical status with the physician, and electively transferring the patient to a higher level of care.

Approximately 10 times per week, 1 day of LOS is avoided by the intervention. In approximately 3 patients per week, intervention has resulted in avoidance of an ICU transfer.

O P S R E P O R T 08/17/99.04:10 - 09/17/99.16:10

[redacted] 714-01 5[redacted] [redacted] 47Y F 08/16/99 [redacted]

Fluid Balance	Intake	Output	Balance
08/15/99.18:01 - 09/16/99.18:00	5050.0	762.0	4288.0
09/16/99.06:43	Pt states voiding, unknown amt.		

I >O by 4.3 liters but unrecorded volumes. Vitals look ok – no need to check on 47 y.o. pt.

Time	sbp/dbp	hr	rr	temp	o2sat	fio2	l/min	
09/17/99.12:02	130/64	74	20	98.0	93			Room air
09/17/99.09:05	150/54	63	22	98.0	94			Room air

[redacted] 714-02 51 [redacted] 62Y F 08/16/99 [redacted]

Fluid Balance	Intake	Output	Balance
08/15/99.19:01 - 08/16/99.18:00	+3390.0	1150.0	3240.0

I >O by 3.2 liters in a 62 y.o. who has now become tachycardic. Check this out!

Time	sbp/dbp	hr	rr	temp	o2sat	fio2	l/min	
08/17/99.12:27	129/76	116	20	97.6	97			Room air
08/17/99.07:24					97			Room air
08/17/99.07:13	144/59	75	20	97.3	99		2.0	

Operations Supervisor Casefinder Triggers

- O2 Sat <90 or Respiratory Rate > 24
- Heart rate > 120
- Fluid balance >= positive 2000cc for last 24 hours
- Hct <30 with Systolic BP <110 or >1 unit pRBCs within previous 6 hours
- Stat orders for Lab, Radiology, or Cardiology >= 2 in one hour or >= 4 in four hours
- Aeromeds administered >= 6 doses in 12 hours

Operations Supervisor Casefinder Report Elements

- VS for last 12 hours
- O2 Sat, O2 administration for last 12 hours
- ABGs in last 24 hours
- Any aeromed or MDI orders, with date/time of last dose
- Previous 6 Hct values
- Fluid balance for previous 2 shifts(I, O, net)

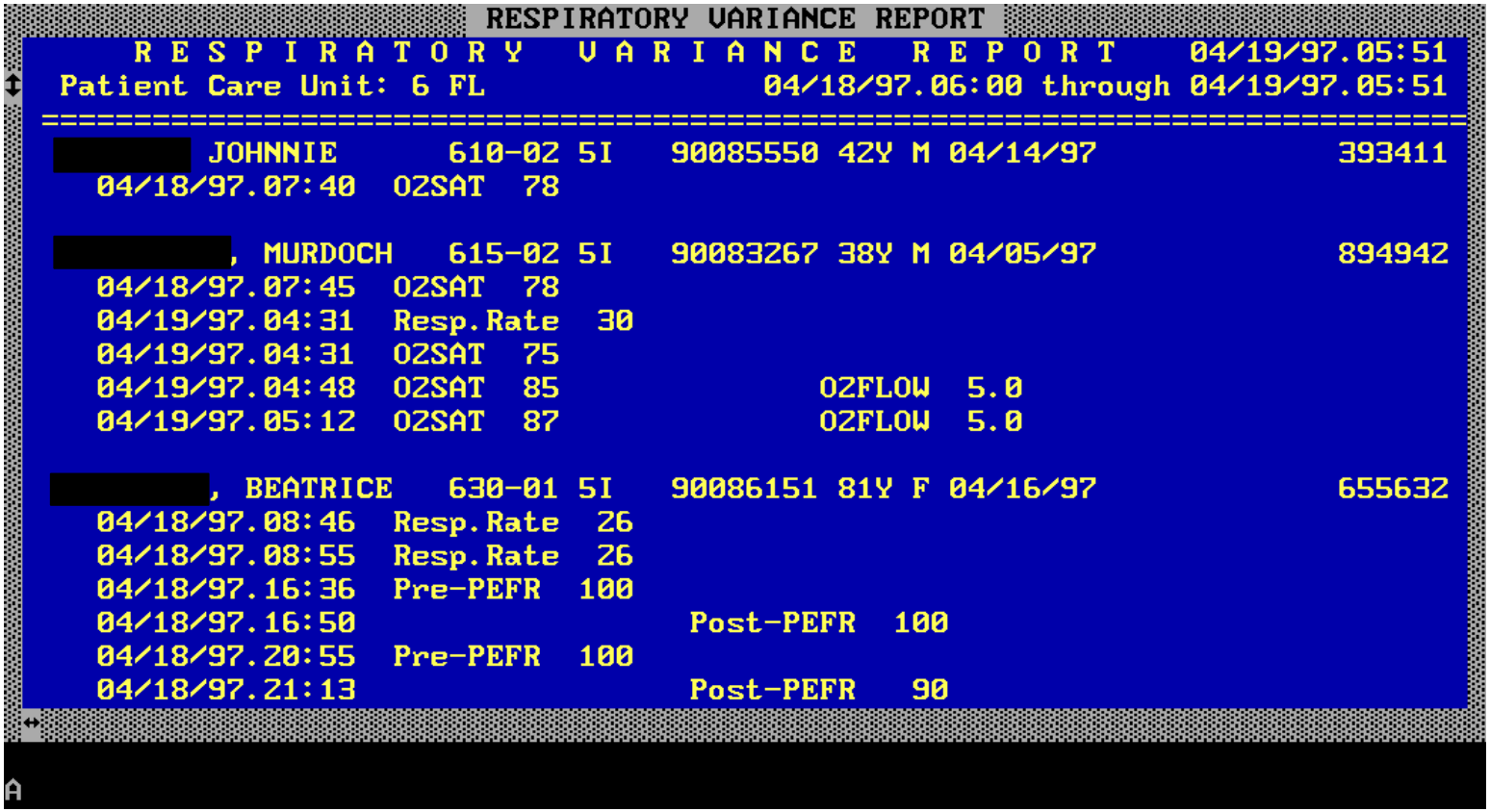
Respiratory Supervisor Casefinder

At Scripps Mercy Hospital in San Diego, respiratory therapy supervisors were supposed to be troubleshooting and mentoring the nurses who administered aeromeds, but instead spent their day evaluating patients who were doing very well or responding to Code Blues.

A Casefinder was developed to identify patients who respiratory status was severely compromised. All patients are included in the report, not just those receiving respiratory therapy.

Interventions include changes to the respiratory therapy regimen, transfer to the ICU, non-crisis intubation, and modification of the patient's resuscitation status.

At least 5 patients/day were identified where intervention was thought to have reduced their length of stay.



Triggers:

- O2 Sat <90
- pO2 <55
- PEFR <150
- RR > 24
- pCO2 >=50
- FiO2 >=55
- O2 Flow >=4 lpm
- Weak cough
- Cough not effective in clearing secretions

10/18/01 Respiratory Alert Report

[redacted]A — **7T18-01** **TOW7** **112-04-26**

RR *31* 10/17/01 11:00 pm **HR** **Pulse Ox** *89* 10/17/01 11:00 pm

ABG Time	pH	PCO_2	PaO_2	SaO_2	HCO_3	FiO_2	O_2 %	O_2 LPM	O_2 Type
10/17/01 1:50 pm	7.37	46	54	87.9	25.1			4.5	NC -

10/18/01 12:00 am	Temp	10/18/01 12:00 am	HR	RR	ABP	NBP	Pulse Ox
	36.80		86	19	/	127 / 57	98

10/17/01 5:57 am	HGB	HCT	10/17/01 5:57 am	WBC	10/17/01 11:02 pm	MDI/SVN	Dosage
	10.6	31.9		12.5		Levalbuterol	1.25 mg

NOTES:

[redacted]E — **7T04-01** **7CPC** **113-77-65**

RR *27* 10/17/01 9:00 pm **HR** **Pulse Ox** *89* 10/17/01 11:00 pm

ABG Time	pH	PCO_2	PaO_2	SaO_2	HCO_3	FiO_2	O_2 %	O_2 LPM	O_2 Type

10/18/01 12:00 am	Temp	10/18/01 12:00 am	HR	RR	ABP	NBP	Pulse Ox
	36.90		52	17	/	122 / 55	91

10/15/01 8:40 pm	HGB	HCT	10/15/01 8:40 pm	WBC	MDI/SVN	Dosage
	12.6	35.8		7.0		

NOTES:

[redacted]A — **4B17-13** **4NICU** **113-79-95**

RR *42* 10/17/01 8:00 pm **HR** **Pulse Ox** *82* 10/17/01 7:00 pm

ABG Time	pH	PCO_2	PaO_2	SaO_2	HCO_3	FiO_2	O_2 %	O_2 LPM	O_2 Type
10/17/01 8:18 pm	7.29	40	128	98.5	19.0			4.0	NC -

10/18/01 12:00 am	Temp	10/18/01 1:00 am	HR	RR	ABP	NBP	Pulse Ox
	36.50		103	14	123 / 63	/	98

10/17/01 6:40 am	HGB	HCT	10/17/01 6:40 am	WBC	10/17/01 10:40 pm	MDI/SVN	Dosage
	10.9	33.2		6.4		Albuterol	2.5mg

NOTES:

Wound Risk Casefinder

Mercy Medical Center Redding noted a pressure ulcer prevalence of 24%, compared to the national average of 15%.

A Casefinder that identifies patients at high risk for developing a pressure ulcer was used to get such patients turned hourly and to assure that the linens were dry.

The intervention dropped the prevalence of pressure ulcers to 10.6%, a more than 50% reduction.

Criteria

- Age >65
- Diagnosis: e.g. diabetes
- Albumin <3.0
- Orders e.g. diabetic diet
- Assessment: immobile
- Interventions: e.g. “incontinent w/ linen change 2-5x/day”

➔Intervention if Positive for 2 criteria

Social Work Casefinder

St. Joseph's Hospital in Phoenix had trouble identifying all abused women and doing so early enough in their hospital stay for intervention to be effective. In addition, post-discharge needs were sometimes identified late enough that it delayed discharges.

Questions were added to the admission assessment which focused on the issue of spousal abuse. A Casefinder that identifies patients with positive answers allows the social workers and discharge planners to focus their interventions.

Criteria

- Transferred from another institution
- Will need assistance at home after discharge
- Will need home health after discharge
- Abused
- Slapped
- Drug or alcohol abuse in the home

Other Casefinders

- Charge Nurse
  - Patients with aberrant vital signs or labs
- Dietary: starving patients
  - Clear liquids, no diet order, NPO for > 24 hrs
- Specialty bed usage
  - All patients, shows equipment type and # days in use
- Stoma
  - All patients with ileostomy, colostomy, ureterostomy
- Pacemaker
  - All patients with pacemaker, shows device type