

The ICU checklist and beyond

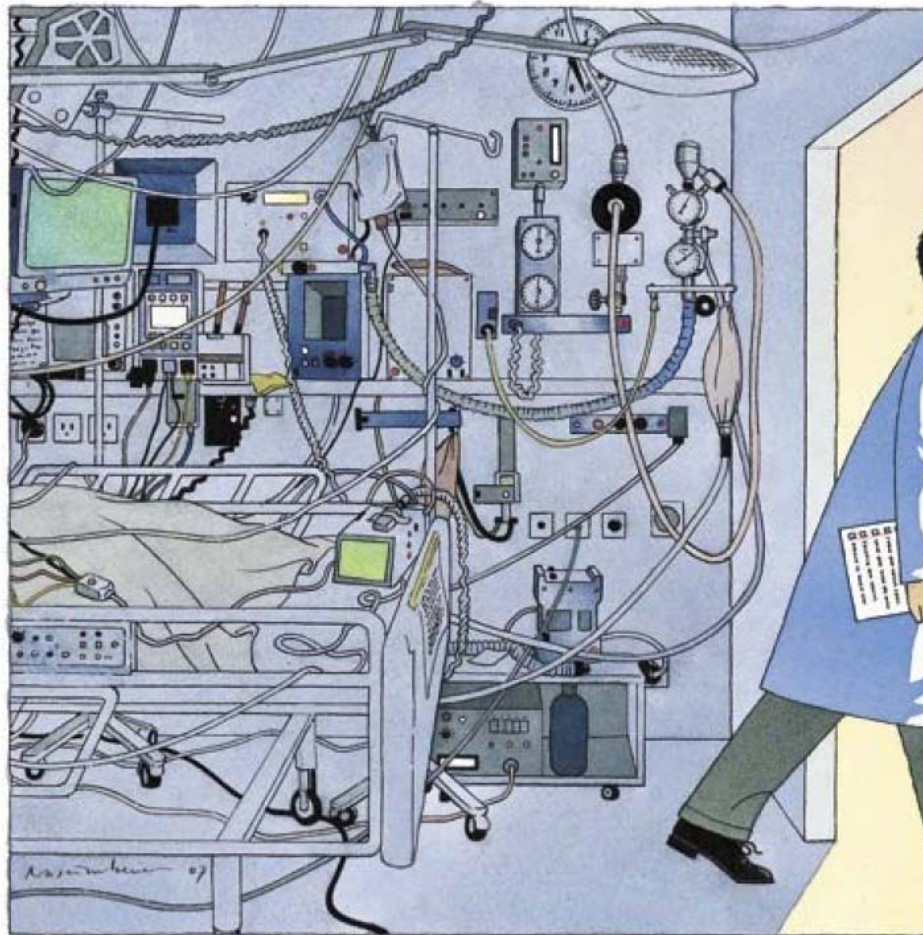


Annals of Medicine

THE CHECKLIST

If something so simple can transform intensive care, what else can it do?

by Atul Gawande December 10, 2007



TheAlfred



CLASSIC PAPER

A look into the nature and causes of human errors in the intensive care unit*

Y Donchin, D Gopher, M Olin, Y Badihi, M Biesky, C L Sprung, R Pizov, S Cotev

Qual Saf Health Care 2003;12:143-148

Donchin et al

- 6 bed ICU with overflow capacity in recovery
- 178 clinical activities required per patient per day
 - Performed by a variety of staff
- 1.7 errors occurring per patient per day
- 2 severe or potentially detrimental errors occurring per day for the unit as a whole

Donchin et al

- Key factors in errors
 - Poor information transfer
 - Understaffing
 - Bad workplace design

Hypothetical scenario

- 28 year old male with multi-trauma
- Ventilated (ARDS, high PEEP)
- Inotropes (SIRS, cardiac contusion)
- RRT (rhabdomyolysis, hypotension)
- ICP monitoring (difficult intra-cranial hypertension)
- Bleeding, source unknown
- Mild coagulopathy

Staff tasks

- Treatment plan for injuries
- Comply with WHO 5 moments of Hand Hygiene
- Insert CVC, arterial line, vascath in accordance with best practice aseptic technique
- V_T 6ml/kg, ideal PEEP, $P_{PLAT} < 30$, $FIO_2 < 0.6$
- Balance inotrope and vasoconstrictors
- Perform TTE
- Run CVVHD, alkalinise urine, avoid IV contrast and other nephrotoxins or if unavoidable use NAC
- Maintain $ICP < 20$, CO_2 35-40, $CPP > 60$, $T 37^\circ C$, Na^+ 140-145, avoid IV colloid
- Transport patient to radiology for repeat CT head, chest, abdomen
- Maintain $Hb > 10$
- Correct coagulopathy, replace Ca^{++} as required
- Suction endo-tracheal tube
- Pressure area care
- Safety checks on all devices
- Recording of all observations (patient and devices) up to 5 minutely onto flowchart
- Patient head up 30° , peptic ulcer prophylaxis, DVT prophylaxis, glucose 4-9, titrate sedation to appropriate level, aperients for bowel movements, run appropriate fluid balance
- Prescribe appropriate antibiotics and record a stop date
- Set physiological goals
- Liaise with Trauma, General, Orthopaedic, Thoracic, Neurosurgeons
- Family discussion
- Respond immediately to any patient deterioration
- Constant communication between all ICU staff
- Communicate all of the above to the next shift coming on (12 hour shifts)
- Do all this for next 15 days, 24 hours per day
- Look after the other 10 patients under your care

- I know I'm going to forget something...

Alfred ICU checklist

<i>Please review each item daily</i>	Blue Chart Review
Sedation/Analgesia/Sleep	
Falls/Injury risk ?restraints	
Ventilator weaning	
Glucose 4-9 mmol/L?	
Feeding/Bowels	
Fluid balance	
Lines ?correct setup ?remove	Daily Examination
Head up 30 degrees	
Pressure area problems?	
X-ray r/v ?ETT, ?Lines ?NGT	Radiology
Antibiotics -Micro r/v -Stop date	Drug Chart
Prophylaxis -DVT -Peptic ulcer	
Daily goals completed on blue chart	Planning
Treatment limitations required?	
Can patient sit out of bed?	
Discharge planning required?	
Family/Parent Unit contact required?	
Tasks allocated to specific Dr	



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The Alfred Intensive Care Unit, Melbourne, Australia

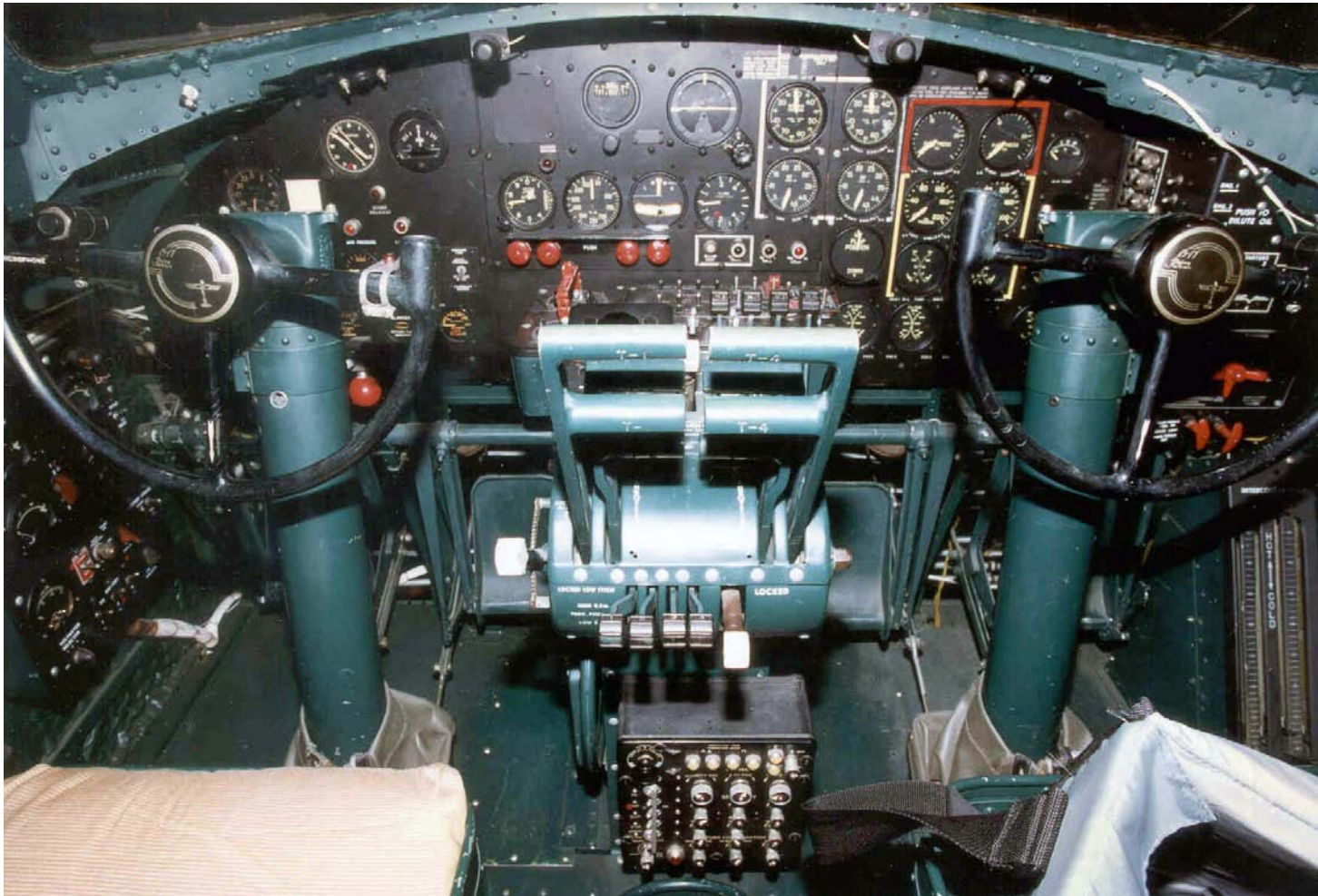


The Alfred





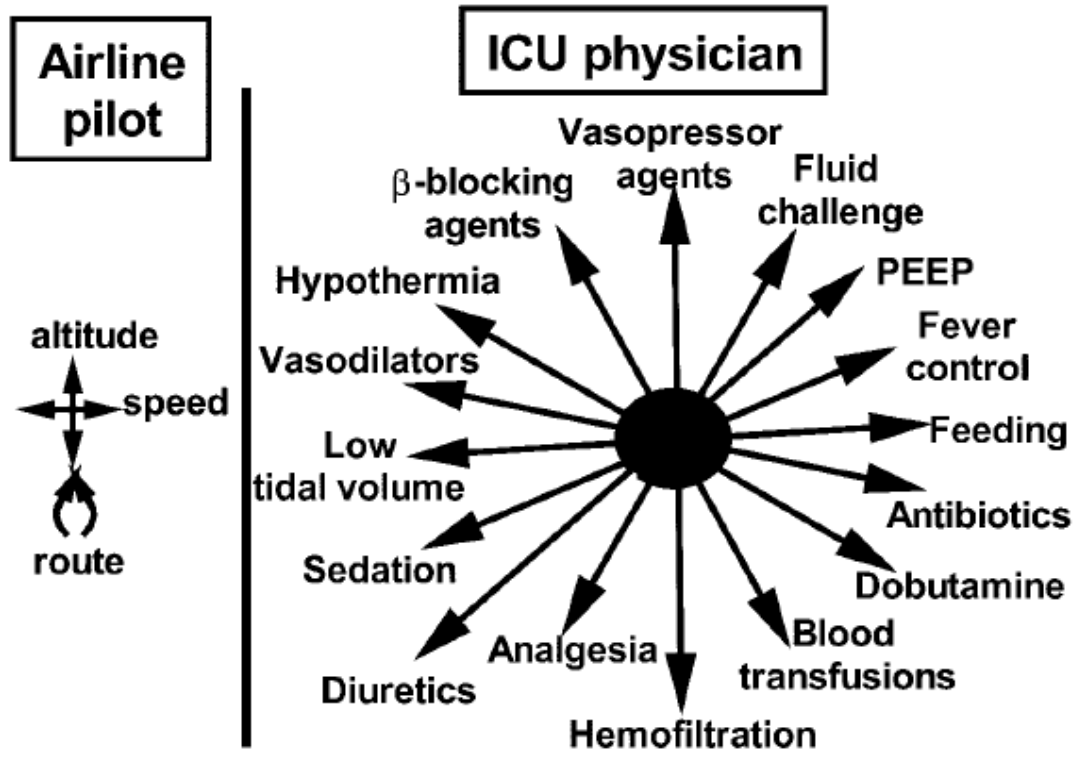
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The Alfred Intensive Care Unit, Melbourne, Australia

ICU versus aircraft

- Patients more varied than aircraft
- Patients more complex than aircraft
- Many more staff to co-ordinate
- Many more possible complications
- An ICU stay is far longer than any flight.



One problem at a time

CLABSI



CVC related blood stream infections

- 80,000 cases per year in U.S
- Associated mortality 5-28%
- Associated costs USD 25,000-50,000 per infection



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The NEW ENGLAND JOURNAL *of* MEDICINE

ESTABLISHED IN 1812

DECEMBER 28, 2006

VOL. 355 NO. 26

An Intervention to Decrease Catheter-Related Bloodstream Infections in the ICU

Peter Pronovost, M.D., Ph.D., Dale Needham, M.D., Ph.D., Sean Berenholtz, M.D., David Sinopoli, M.P.H., M.B.A., Haitao Chu, M.D., Ph.D., Sara Cosgrove, M.D., Bryan Sexton, Ph.D., Robert Hyzy, M.D., Robert Welsh, M.D., Gary Roth, M.D., Joseph Bander, M.D., John Kepros, M.D., and Christine Goeschel, R.N., M.P.A.

How to avoid CRBSIs

1. Wash your hands before inserting CVC
2. Clean the skin with 2% chlorhexidine
3. Use maximal sterile barrier precautions
4. Avoid the femoral site if possible
5. Remove unnecessary CVCs

Ward round

"To be a successful surgeon, you need the eye of a hawk, the heart of a lion and the hands of a lady".





Measurable Outcomes of Quality Improvement in the Trauma Intensive Care Unit: The Impact of a Daily Quality Rounding Checklist

Joseph J. DuBose, MD, Kenji Inaba, MD, Anthony Shiflett, DO, Christine Trankiem, MD, Pedro G. R. Teixeira, MD, Ali Salim, MD, Peter Rhee, MD, MPH, Demetrios Demetriades, MD, PhD, and Howard Belzberg, MD

Objective: The use of “care bundles” in the prevention of ventilator-associated pneumonia (VAP) and other intensive care unit (ICU) complications have been increasingly used in critical care practice. However, the effective implementation of these strategies represents a challenge in a busy Level I trauma ICU. We devised a daily “Quality Rounds Checklist” (QRC) tool for use in the ICU to increase compliance with these prophylactic measures and identify areas for improvement in quality of care.

Methods: A prospective before-after design was used to examine the effectiveness of the QRC tool in promoting compliance with 16 prophylactic measures for VAP, deep venous thrombosis or pulmonary embolism, central line infection and

other ICU complications. Compliance was assessed for 1 month before institution of the QRC. On daily analysis, the QRC was then applied by the ICU fellow to assess compliance. Any deficiencies were actively corrected in real time. Compliance was assessed by a multidisciplinary team for the next 3 months and compared with the pre-QRC compliance rates.

Results: Implementation of the QRC tool facilitated improvement of all measures not already at >95% compliance. Compliance with VAP prevention measures of head of bed elevation >30 degrees (35.2% vs. 84.5%), sedation holiday (78.0% vs. 86.0%), and prophylaxis for both peptic ulcer disease (76.2% vs. 92.3%) and deep venous thrombosis (91.4% vs. 92.8%) were all increased. A

decrease in central line duration >72 hours (62.4% vs. 52.8%) and ventilator duration >72 hours (74.0% vs. 61.7%) was also noted. Additionally, a decrease in mean monthly rates per 1,000 device days of VAP (16.3 vs. 8.9), central line infection (11.3 vs. 5.8) and self-extubation (7.8 vs. 2.2) was demonstrated.

Conclusion: Introducing a daily QRC tool facilitated improved compliance rates for 16 clinically significant prophylactic measures in a busy Level I trauma ICU. The daily use of this tool, requiring just a few minutes per patient to complete, results in a sustainable improvement in patient outcomes.

Key Words: Injury, Wounds and injuries, Trauma, Outcome assessment, Quality assessment.

J Trauma. 2008;64:22–29.

DuBose et al

- Busy level 1 Trauma ICU
- Before and after study

- Intervention was a “Daily Quality Rounding Checklist”
- Data collected for 1 month baseline, 3 month post intervention

Trauma ICU checklist

- PUD prophylaxis
- DVT/PE prophylaxis
- Sedation holiday
- Glucose control
- Low V_T
- Assessed for ventilator weaning
- Continuous subglottic suctioning
- HOB 30°
- Nutrition
- Antibiotic need
- Invasive device need

Results

- Less
 - VAP
 - CLABSI
 - Self-extubations
- Better
 - DVT prophylaxis compliance

Other ICU checklists

Continuing Medical Education

Give your patient a fast hug (at least) once a day*

Jean-Louis Vincent, MD, PhD, FCCM

Table 1. The seven components of the Fast Hug approach

Component	Consideration for Intensive Care Unit (ICU) Team
Feeding	Can the patient be fed orally, if not enterally? If not, should we start parenteral feeding?
Analgesia	The patient should not suffer pain, but excessive analgesia should be avoided
Sedation	The patient should not experience discomfort, but excessive sedation should be avoided; “calm, comfortable, collaborative” is typically the best level
Thromboembolic prevention	Should we give low-molecular-weight heparin or use mechanical adjuncts?
Head of the bed elevated	Optimally, 30° to 45°, unless contraindications (e.g., threatened cerebral perfusion pressure)
Stress Ulcer prophylaxis	Usually H ₂ antagonists; sometimes proton pump inhibitors
Glucose control	Within limits defined in each ICU

Anaesth Intensive Care 2006; 34: 322-328

A Pilot Study to Test the Use of a Checklist in a Tertiary Intensive Care Unit as a Method of Ensuring Quality Processes of Care

K. M. HEWSON*, A. R. BURRELL†

N.S.W. Intensive Care Coordination and Monitoring Unit, Penrith, New South Wales, Australia



Indicator

Is the patient in pain at rest?
Is the patient in pain with relevant movement?
If there is pain, has it been addressed?
Sedation—is the patient able to respond appropriately?
If ventilated, is the head of the bed raised 30 degrees?
Is the patient being weaned?
If not ventilated, is the patient sitting out of bed daily?
Has the age of all lines been checked?
Is the patient being fed (enteral, parenteral, oral)?
Is the patient receiving thromboprophylaxis?
Is the patient receiving stress ulcer prophylaxis?
Is there an antibiotic strategy in place?
Have the antibiotics been reviewed?
Was the blood sugar recorded in the last 12 hours?
If yes, was the last recorded blood sugar <8.3 mmol/l?
If yes, was the last recorded blood sugar <10.0 mmol/l?
Has the microbiology been checked?
Have the bowels been opened in the last 24 hours?

QUALITY CORNER

Improving Communication in the ICU Using Daily Goals

Peter Pronovost, Sean Berenholtz, Todd Dorman, Pam A. Lipsett, Terri Simmonds, and Carol Haraden

Background: Clear communication is imperative if teams in any industry expect to make improvements. An estimated 85% of errors across industries result from communication failures.

Purpose: The purpose of this study was to evaluate and improve the effectiveness of communication during patient care rounds in the intensive care unit (ICU) using a daily goals form.

Design: We conducted a prospective cohort study in collaboration with the Volunteer Hospital Association (VHA), Institute for Healthcare Improvement (IHI), and Johns Hopkins Hospital's (JHH) 16-bed surgical oncology ICU. All patients admitted to the ICU were eligible. Main outcome variables were ICU length of stay (LOS) and percent of ICU residents and nurses who understood the goals of care for patients in the ICU. Baseline measurements were compared with mea-

surements of understanding after implementation of a daily goals form.

Results: At baseline, less than 10% of residents and nurses understood the goals of care for the day. After implementing the daily goals form, greater than 95% of nurses and residents understood the goals of care for the day. After implementation of the daily goals form, ICU LOS decreased from a mean of 2.2 days to 1.1 days.

Conclusion: Implementing the daily goals form resulted in a significant improvement in the percent of residents and nurses who understood the goals of care for the day and a reduction in ICU LOS. The use of the daily goals form has broad applicability in acute care medicine.

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What needs to be done for the patient to be discharged from the ICU?
What is this patient's greatest safety risk? How can we reduce that risk
Pain mgt/sedation
Cardiac/volume status
Pulmonary/ventilator (PP, elevate HOB)
Mobilization
ID, cultures, drug levels
GI/Nutrition
Medication changes (can any be discontinued?)
Tests/procedures
Review scheduled labs; morning labs and CXR
Consultations
Communication with primary service
Family communication
Can catheters/tubes be removed?
Is this patient receiving DVT/PUD prophylaxis?

- No outcome data from these checklists but subjectively they appear to improve workflow
- Feedback from staff was positive

- Checklists should help, but...

Paper checklist challenges

- Compliance
- Coping with multiple checklists
- Lack of time for paperwork
- Auditing compliance

Checklists

CVC
insertion

Ward round

Intubation

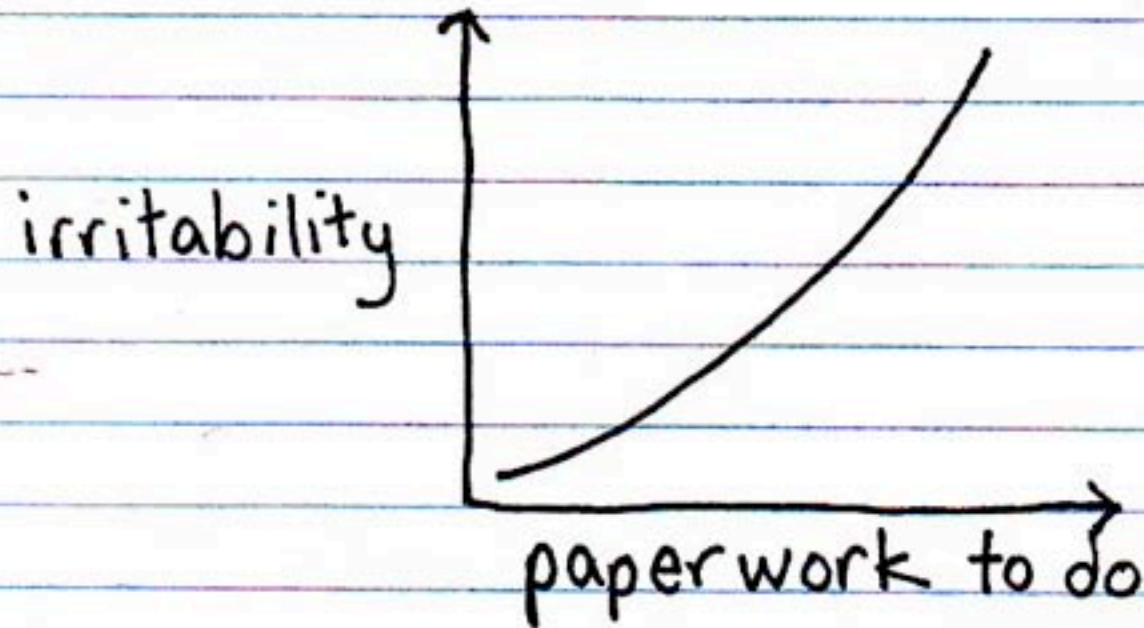
Admission

Discharge

Equipment

Handover

CRM



Alfred ICU checklist

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Treatment limitations required?	
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Family/Parent Unit contact required?	
Tasks allocated to specific Dr	



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Better Clinical Information Systems are required

- Bedside computer
- Workflow guide provided for every significant clinical activity
- Automation of certain items e.g. DVT, PUD prophylaxis

Commercial CIS available

- Costly
- May not be fit for purpose
- Can be difficult to modify

Alternatives

- Open source
- Public domain
- Government funding useful
- VistA

Nurse: Kerry Addison
Day 24 in ICU
Admitted to Alfred :

VASILIOS DANOPOULOS
MRN: 0831670
CTHR

Summary

Prov Diag:
1st ICU Admission
Apache 3: PostOperative - Cardiovascular - Coronary Artery Bypass Grafts [ANZICS addition] - CABG alone, coronary artery bypass grafting
Presenting History
 62yr old admitted post CAGS x 2.(LIMA-LAD,RA-RCA).Failed PCI in March 2011.Medical management but ongoing angina and dyspnoea at 50metres.

Past History
 1) Type II DM-insulin dependent since Feb 2011
 2) GORD-poorly controlled
 3) Micro albuminuria/CRI
 4) Obesity
 5) T9 compression. #
 6) L5 disc prolapse

ICU Admission

Current Procedures	Fluid Balance
24/11/2011 - Arterial Line (14.5 days) Living Set Change Due	Last 24 Hours: UNKNOWN
27/11/2011 - CVC (12.4 days)	Last 7 Days: 0
01/12/2011 - Feeding Tube (8.3 days)	Total ICU Stay: 0
04/12/2011 - Intubation (4.8 days)	
04/12/2011 - Invasive Ventilation (4.8 days)	
06/12/2011 - IDC (2.9 days)	

Clinical Update

ICU Progress/Shift events

Progress Notes	To Do List	Important Micro and Other Results for Handover	
Keep Permanently on Handover? <input type="checkbox"/>			Save

ICU Discharge

Procedures

Care Plan

Fluid Balance

Cardiac Arrest

Intubation

08/12/2011 17:47:00	Lantus increased to 70units bd. Family meeting today - for PEG Monday 1045. Trache hooding. USS lower limbs - no DVT			Francene Bond
07/12/2011 19:05:00	Hyperglycaemia today (1/2 mane lantus whilst awaiting PEG - PEG cancelled, feeds resumed, novorapid to-ups). Trache hooded but tires.	Family meeting 1130 Thurs to discuss PEG. Awaiting USS lower limbs		Edited Francene Bond
06/12/2011 18:52:00	Lantas increased. Trache hooded today. CTB - maturing cerebellar infarct without complications. D/W CTHR (Krishna) - agrees with plan for PEG Wed.	WH heparin mane (for PEG)		Francene Bond
06/12/2011 05:40:00	hyperglycaemia - req extra novorapid overnight, slight tachy, Art line swing, 0300 frusemide w/h			Jessica Kennedy
05/12/2011 06:53:00	diaze overnight for restlessness			Jessica Kennedy
04/12/2011 16:50:00	Tracheostomy done, continue to wake	Watch serial troponin		Kate Drummond
04/12/2011 06:28:00	restless overnight, able to be re-directed, not much sleep			Jessica Kennedy
02/12/2011 19:09:00	not for extubation, likely tracheostomy.			Bevan Roodenburg
01/12/2011 04:44:00	Ongoing apnoea, maintained on SIMV overnight			Brooke Robertson
30/11/2011 07:08:00	PEEP weaned, apnoeas on spont ventilation Requiring norad for hypotension	? Extubate		Brooke Robertson
29/11/2011 19:42:00	stable, cerebellar breathing, Haemophilus Pneumonia, extubation planning for tomorrow	blood cultures	Haemophilus from sputum, beta lactamase	Jonathan Claydon
29/11/2011 05:19:00	On propofol overnight for tube tolerance Hyperglycaemia - requiring 11 units actrapid/ hr Frequent apnoeic episodes			Brooke Robertson
28/11/2011 18:15:00	stable today, noradrenaline weaned, occasional disordered breathing	wean PEEP from 0500, aim extubation after 0800		Jonathan Claydon
28/11/2011 05:05:00	MAP - 65, SBP - 90, commenced on norad Changed to morphine/ midaz, propofol ceased Persistently febrile- cultures sent			Brooke Robertson
28/11/2011 05:04:00				Edited Brooke Robertson

Clinical

PACS

Cerner Power Chart

ICU

riskman

iPharmacy

DRUGNet

Guidance

Top Guide Lines

ICUActive Home

GENERAL

Calc





SAFETY CULTURE