



## A scalable electronic system for collecting co-morbidity data in cancer outpatient clinics

electronic Co-morbidity Assessment System (eCAS)

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## Background

- Epidemiological studies extract co-morbidity data using a variety of validated methods/ instruments
- Clinical consultations do not commonly record previous medical problems using formal co-morbidity assessment
- Electronic patient self-report data capture and linkage already in use in clinical care



- Electronic data capture may provide a quick, cost-effective and accurate way to aid co-morbidity measurement for use in:
  - clinical practice
  - cancer registration

## Service development project Aim

*To develop and evaluate an  
electronic-Co-morbidity Assessment System  
(eCAS)  
for use in cancer practice using the  
Adult Co-morbidity Evaluation-27 (ACE-27)  
with results stored in the individual's  
electronic patient record (EPR) and  
electronically transferred to the cancer registry.*

## What is the Adult Co-morbidity Evaluation-27 (ACE-27)?

- 26 'questions' + overall co-morbidity score
- 12 domains
 

• Cardiovascular	Respiratory	Gastrointestinal	Renal
• Endocrine	Neurological	Psychiatric	Rheumatological
• Immunological	Malignancy	Substance abuse	Body weight
- 3 levels of decompensation
  - Grade 3 Severe; Grade 2 Moderate; Grade 1 Mild
- Scoring
  - any domain "3" – overall co-morbidity "3"
  - any 2 domains "2" – overall co-morbidity "3"
  - If "1" or one "2" highest score then overall co-morbidity "1" or "2"

Piccirillo JF, Costas I, Claybour P, Borah AJ, Grove L, Jeffe DB (2003) The Measurement of Comorbidity By Cancer Registries. *The Journal of Registry Management* 30(1): 8-14

## How would eCAS work in practice?

- New patient attends clinic
- Nurse logs onto QTool with patient username and password, enters weight and height
- Patient completes specifically designed self-report questionnaire which 'maps' to the ACE-27
- During consultation clinician completes ACE-27 accessed via electronic patient record (EPR) (patient reported areas highlighted)
- Co-morbidities listed for use in clinical practice
- ACE-27 domain/overall scores generated
- ACE-27 scores transferred across to Cancer Registry

## How we planned the project

<b>Stage one: set-up</b>	<b>Stage two: implementation</b>	<b>Stage three: performance</b>
<ul style="list-style-type: none"> <li>• Purchase hardware</li> <li>• Software programming</li> <li>• Training manual</li> <li>• Development of patient self-report</li> </ul>	<ul style="list-style-type: none"> <li>• Surgical bladder (CNS led; 4-6 patients)</li> <li>• Gynaecological oncology (team approach; 5 new patients/ 40 week)</li> <li>• Fast track lung (team approach; 25 patients week)</li> <li>• 100-day post HSCT (team approach; 1-2 new patients/25-30 week)</li> </ul>	<ul style="list-style-type: none"> <li>• Patient-clinician</li> <li>• ACE-27 clinical notes audit</li> <li>• ACE-27 eCAS-audit comparison</li> </ul>

## Stage One

- Tablet touchscreens procurement took five months



- IT programming and testing
- Training manual



- Patient co-morbidity self-report developed, tested and amended, comprises:

- weight and height for Body Mass Index calculation (staff completed)
- 23 patient self-report items with response categories yes/no

1	Have you ever had a heart attack?	Yes	No
2	Have you ever had a stroke?	Yes	No
3	Have you ever had a blood clot in your leg?	Yes	No
4	Have you ever had a blood clot in your lung?	Yes	No
5	Have you ever had a blood clot in your arm?	Yes	No
6	Have you ever had a blood clot in your neck?	Yes	No
7	Have you ever had a blood clot in your head?	Yes	No
8	Have you ever had a blood clot in your stomach?	Yes	No
9	Have you ever had a blood clot in your back?	Yes	No
10	Have you ever had a blood clot in your chest?	Yes	No
11	Have you ever had a blood clot in your pelvis?	Yes	No
12	Have you ever had a blood clot in your hip?	Yes	No
13	Have you ever had a blood clot in your shoulder?	Yes	No
14	Have you ever had a blood clot in your neck?	Yes	No
15	Have you ever had a blood clot in your head?	Yes	No
16	Have you ever had a blood clot in your stomach?	Yes	No
17	Have you ever had a blood clot in your back?	Yes	No
18	Have you ever had a blood clot in your chest?	Yes	No
19	Have you ever had a blood clot in your pelvis?	Yes	No
20	Have you ever had a blood clot in your hip?	Yes	No
21	Have you ever had a blood clot in your shoulder?	Yes	No
22	Have you ever had a blood clot in your neck?	Yes	No
23	Have you ever had a blood clot in your head?	Yes	No

- Minor ACE-27amendments to reflect UK medical nomenclature.

## Stage Two: implementation

	Surgical bladder cancer	Gynaecological medical oncology	Fast track lung
<b>Number of clinics</b>	15	17	5
<b>Number of patients identified</b>	50	38	20
<b>Self-report completions</b>	42	19	12
<b>eCAS full completions</b>	41 (82%)	14 (37%)	7 (35%)
<b>Non completion reasons</b>			
Patient did not attend	1	1	0
Technical problems	3	7	1
Patient refusal	1	5	0
Organisational	1	4	10
Patient too ill	0	1	1
Not known	3	6	1

## Stage Three: eACE-27 performance

- Patient - clinician agreement (yes/no response)
  - all kappa > 0.41 (moderate)
  - poorest Rheumatological domain kappa = 0.43
- Clinician - clinician ACE-27 scores agreement (audit) (4 response categories)
  - all kappa  $\geq$  0.81 (very good) bar
  - Malignancy (kappa = 0.79; 49/50 exact agreement)
- eCAS-audit derived ACE-27 scores agreement (4 response categories)
  - all kappa > 0.41 (moderate) bar
  - Psychiatric (kappa = 0.37; 47/50 exact agreement)
  - Malignancy (kappa = 0.23; 39/50 exact agreement)
  - (11 ACE-27 mismatches scored in eCAS not in audit)

kappa of 0.21-0.40 (fair), 0.41-0.60 (moderate), 0.61-0.80 (good) and .81-1.00 (very good)

## Was eCAS a success?

In part but it only needs one thing to fail and the whole system fails

IT	Implementation	Performance
<ul style="list-style-type: none"> <li>• Hardware </li> <li>• Software </li> </ul>	<ul style="list-style-type: none"> <li>• Surgical bladder </li> <li>• Gynaecological oncology </li> <li>• Fast track lung </li> </ul>	<ul style="list-style-type: none"> <li>• Reasonable </li> <li>• Malignancy </li> <li>• Transfer to registry</li> </ul>
<p><b>Training</b></p> <ul style="list-style-type: none"> <li>• Manual </li> <li>• Staff </li> </ul>	 <ul style="list-style-type: none"> <li>• 100-day post HSCT</li> </ul>	<p>Not tested</p>
<p><b>Questionnaires</b></p> <ul style="list-style-type: none"> <li>• Self-report </li> <li>• ACE-27 </li> </ul>	<p>Not tested</p>	<p>Not tested</p>

## Top tips for implementation

### •Staff

- Engage with staff from the start and find out how the system could fit in/be adapted to suit this clinic
- All staff groups involved must 'buy in' to it
- One clinical staff member should have overall responsibility
- There must sufficient number of others engaged (critical mass) so implementation will continue if the early adopter leaves

### •Space

- If possible negotiate exclusive use of a room close to the major clinic activities with network access
- If it is a shared space make sure all concerned know you have a right to be there
- Ensure there are sufficient network sockets (wireless)/hardware available in the space for all users

## Top tips for implementation

### •Priority

- Lip service is not good enough
- Will other things have to be dropped if this is introduced?
- How will you cover absences?

### •Support

- Make sure there is training for all with 'boosters' if required
- Easy access to IT support
- Recognition of activity in annual reviews

### •Where first?

- Not too busy/complex clinic
- Identify a potential early adopter
- Get it up and running there and then use this as an example
- Advertise success

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