Aims and objectives. This review investigated the impact of consumer participation in recognition of patient deterioration and response through call activation in rapid response systems.

Background. Nurses and doctors have taken the main role in recognition and response to patient deterioration through hospital rapid response systems. Yet patients and visitors (consumers) have appeared well placed to notice early signs of deterioration. In response, many hospitals have sought to partner health professionals with consumers in detection and response to early deterioration. However, to date, there have been no published research-based reviews to establish the impact of introducing consumer involvement into rapid response systems.

Design. A critical research-based review was undertaken.

Methods. A comprehensive search of databases from 2006–2014 identified 11 studies. Critical appraisal of these studies was undertaken and thematic analysis of the findings revealed four major themes.

Results. Following implementation of the consumer activation programmes, the number of calls made by the consumers following detection of deterioration increased. Interestingly, the number of staff calls also increased. Importantly, mortality numbers were found to decrease in one major study following the introduction of consumer call activation. Consumer and staff knowledge and satisfaction with the new programmes indicated mixed results. Initial concerns of the staff over consumer involvement overwhelming the rapid response systems did not eventuate. Evaluation of successful consumer-activated programmes indicated the importance of: effective staff education and training; ongoing consumer education by nurses and clear educational materials.

Conclusions. Findings indicated positive patient outcomes following introduction of consumer call activation programmes within rapid response systems. Effective consumer programmes included information that was readily accessible, easy-to-understand and available in a range of multimedia materials accompanied by the explanation and support of health professionals.

Relevance to clinical practice. Introduction of consumer-activated programmes within rapid response systems appears likely to improve outcomes for patients experiencing deterioration.

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Key words: call initiation, consumer call activation, consumer participation, deteriorating patient, family, literature review, medical emergency team, patient, rapid response system

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Introduction
Life threatening incidents have frequently been identified in today’s complex hospital environment; mortality figures have increased and it has become apparent that too often the latter have resulted from preventable health care errors. Early recognition and response to patient deterioration have reduced the potential impact of such adverse events. Health professionals need to recognise and respond to early signs of patient deterioration and activate rapid response systems to provide rapid medical intervention.

Rapid response systems (RRS) have been designed to incorporate call criteria that clarify those seriously ill, at-risk and patients with conditions that have deteriorated through ‘abnormal observations and vital signs’ (Hillman et al. 2014, p. 521). These systems have advocated for rapid care of worsening conditions, operational protocols for use across health care organisations, ‘de-emphasis of usual hierarchies and interprofessional barriers’ and ‘consultation by experts in critical illness’ (Hillman et al. 2014, p. 521).

Even with RRS in place, patients have continued to deteriorate without early recognition. Research has indicated traditional hegemonic and cultural barriers have inhibited nurses (Jones et al. 2009) from recognising and/or initiating early responses to patient deterioration through rapid response systems leading to suboptimal care. Shearer et al. (2012, p. 574) also pointed towards ‘local socio-cultural factors and intra-professional hierarchies’ as reasons why nurses and doctors have not always activated rapid response protocols swiftly. Hands et al. (2013, p. 725) agreed, noting these issues may have prevented ‘staff from recording vital signs and acting upon them, even when this contravenes hospital policy’.

Findings from Donaldson et al. (2014) who investigated the cause of 2010 patient safety-related hospital deaths in England (2010–2012) demonstrated the seriousness of this concern. Analysis of these deaths indicated three major themes as deficits of system failure: ‘mismanagement of deterioration (35%), failure of prevention (26%), deficient checking and oversight (11%)’ (Donaldson et al. 2014, p. 1). Each of these deficits in hospital systems were found to be directly related to recognition and response to clinical deterioration.

In response to insufficient early detection of patient deterioration by health professionals alone, patients, family members and carers (consumers) have been increasingly recognised as well placed to identify early deterioration and escalate care. Recently, hospitals have begun to educate consumers as prospective call activators within the RRS (Gerdik et al. 2010). These health care organisations have required nurses and doctors to actively partner with consumers (Wellard et al. 2003, Dean et al. 2008) in the belief that consumer involvement would lead to increased early detection of patient deterioration. Health care services, aiming to improve patient outcomes when deterioration was noted, have introduced consumer call activation programmes within the RRS. However, the impact of consumer involvement within these programmes on patient outcomes along with the effect on nonpatient consumers has yet to be fully assessed.

Therefore, a literature review has been undertaken with the aim of investigating the impact of consumer participation on early recognition and response to patient deterioration through activation of RRS. Objectives of the review sought to identify the impact of consumer involvement on patient outcomes, consumer knowledge, staff knowledge and satisfaction with these programmes.

Methods
A critical, research-based review was undertaken: incorporating ‘identification, analysis and synthesis of research findings from independent studies to determine the current knowledge’ (Burns et al. 2011, p. 24). A comprehensive systematic search identified relevant studies that were appraised against criteria from Long et al.’s (2002) evaluative tool for mixed method designs. Relevant themes and sub-themes were established through thematic analysis (Richardson-Tench et al. 2011).

Systematic searches were conducted using online databases: ProQuest, PubMed, Cumulative Index to Nursing and Allied Health Literature, Science Direct, Google Scholar and Scopus. Key words included: consumer participation, medical emergency team, rapid response team, critical care outreach, deteriorating patient, family initiated and
family activation. Expert advice and reference lists of key articles were also used.

Consumer activation of RRS has been a relatively recent phenomenon in the western world. Studies including adult and paediatric patients were deemed equally useful in measuring the outcomes of consumer participation in RRS activation. Essentially, consumers have been asked to activate RRS for all hospital inpatients regardless of age. Any type of RRS was deemed appropriate; a focus on consumer participation in call activation was the constant requirement. Accordingly, inclusion and exclusion search criteria sought to identify studies focused on consumer activation of RRS, published between 2006–2014 (Table 1).

Table 1 Inclusion and exclusion criteria

<table>
<thead>
<tr>
<th>Inclusion criteria</th>
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<tbody>
<tr>
<td>Published between 2005–2014</td>
<td>Published prior to 2005</td>
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<tr>
<td>Published in English language</td>
<td>Published in language other than English</td>
</tr>
<tr>
<td>Primary research and practice improvement studies related to rapid response systems published in journals or conference proceedings</td>
<td>Articles related to rapid response systems not based on primary research or practice improvement studies</td>
</tr>
<tr>
<td>Inclusive of the acute care setting</td>
<td>Did not relate to acute care setting</td>
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<tr>
<td>Related to consumer recognition and responding to deterioration or at-risk patients in acute health care</td>
<td>Related to consumer participation/experiences in acute health care</td>
</tr>
<tr>
<td>Related to consumer activation of a rapid response team/medical emergency team/critical care outreach</td>
<td>Related to health care professionals only activation of a rapid response team/medical emergency team/critical care outreach</td>
</tr>
<tr>
<td>Related to consumer participation in advocating for oneself/family member in relation to deterioration</td>
<td>Related to consumer participation in policy making in health care</td>
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A comprehensive search for pertinent literature was undertaken (Fig. 1). A total of 57 articles were initially selected; exclusions were made based on the inclusion criteria, leaving 17 studies for further consideration. Six studies were eliminated; eight remained from the initial electronic search, one identified by expert and two through reference lists leaving 11 studies to be appraised.

Critical appraisal

Analysis of the quality of the 11 studies was undertaken through a rigorous critical appraisal. Long et al.’s (2002) evaluation tool for mixed methods designs was used in the

Figure 1 Flow chart of literature search.
critical appraisal of the quantitative and mixed method studies under review. This tool was developed and validated at the University of Salford (Long et al. 2002). Nine of the tool’s highly pertinent questions were chosen and applied to the reviewed studies (Table 2).

Critical appraisal of the studies revealed specific strengths and limitations (Table 3). The appraisal process indicated two studies met all of the criteria (Gerdik et al. 2010, Odell et al. 2010). These studies were found to be robust; results were demonstrated through well-defined data collection and analysis methods indicating generalisability.

The remaining nine studies evaluated what appeared to be hospital-based practice or quality improvement projects with limited description of the research aims, sample, data collection and/or analysis methods. Two in particular (Bybee 2008, Zix et al. 2012) provided very brief descriptions of the research methods and findings making it difficult to judge their rigour. Nevertheless, these nine studies were found to be sound and used similar acute settings and populations with findings that informed this review. These studies offered descriptive quantitative and qualitative findings on outcomes for patient- and family-activated RRS programmes. While results of these nine studies were approached with caution, their findings emerged as consistent with the results of the two more robust studies (Gerdik et al. 2010, Odell et al. 2010). Therefore, all 11 studies were included in this review.

### Summary of the reviewed studies

The 11 reviewed studies (10 from the USA and one from the UK) have been summarised (Table 4). Ten studies focused on the programmes related to the introduction of patients and family call activation within the RRS across units and/or hospitals. One study evaluated outcomes of a consumer call activation programme following patient discharge from Intensive Care Unit to hospital units. Study patient populations ranged from individual hospital units with relatively small numbers (90–147) to multiple units and hospitals with large populations (336–1061). Across the 11 studies, research periods following implementation of the consumer call activation within the RRS varied from 3–25 months to 60 months.

### Thematic analysis

The reviewed studies included simple statistics e.g. the number of calls over a set time period along with quantitative and qualitative survey data; therefore thematic analysis was chosen. Richardson-Tench et al.’s (2011) thematic analysis

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**Table 2** Key questions in the critical appraisal of the studies

<table>
<thead>
<tr>
<th>Q1. Are the aims clearly stated?</th>
<th>Q2. Is there a clear relationship between the study and the area of topic review?</th>
<th>Q3. Is the setting for the study appropriate for examination for the research question?</th>
<th>Q4. Is the sample (informants and setting) appropriate to the aims of the study?</th>
<th>Q5. Is there sufficient breadth (i.e. contrast of two or more perspectives)?</th>
<th>Q6. Have ethical issues been adequately addressed?</th>
<th>Q7. Were data collection and analysis methods described in clear and sufficient detail within the study?</th>
<th>Q8. Are the study’s findings generalisable?</th>
<th>Q9. Are implications for policy and service practice stated?</th>
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<tbody>
<tr>
<td>Gerdik et al. (2010)</td>
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<td>Bybee (2008)</td>
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<td>Greenhouse et al. (2006)</td>
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<td>Ray et al. (2009)</td>
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**Table 3** Summary of critical appraisal

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41
<table>
<thead>
<tr>
<th>Study</th>
<th>Aim</th>
<th>Setting and sample</th>
<th>Research design/methods</th>
<th>Programme name, content and implementation</th>
<th>Major findings</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gerdik et al. (2010) Florida, USA</td>
<td>Explore the successful implementation of a family and patient activated rapid response team in an adult level 1 trauma centre</td>
<td>Shands Jacksonville Medical Center, a 696 bed level one trauma centre. Initial 2 years of consumer enhanced RRS programme (October 2007-2009)</td>
<td>Quantitative Survey following consumer-activated RRS calls Survey questions based upon literature review findings, results of interviews conducted by other organisations with successful implementation of similar programmes Statistical analysis completed using SAS 9.1, EXCEL and SPSS 16.0.</td>
<td>Partners in Care Pre-existing RRS Scripted educational training for staff and family based on 'Zespy's Safest in America'. In-service education of nurses. Education by nurses of the consumers on admission. Given printed material, posters throughout hospital, phone stickers</td>
<td>Twenty-five patient (52%)/family (48%) calls (104/month). Staff and consumer calls increased from 47-193 calls/month. Increase in transfers to higher level of care (HLOC) from 12.8/month-45.4/month. Decrease in non-ICU codes. Significant mortality decrease following implementation. Decrease in deaths across period. Consumers highly rated programme explanation. Call reason: worried about pt. 'something doesn't feel right', shortness of breath and pain management. Overwhelming positive consumer satisfaction. Initial staff concern of potential overload - no false positive calls.</td>
</tr>
<tr>
<td>Bybee (2008) Illinois, USA</td>
<td>Describe the implementation of a family-activated rapid response team</td>
<td>Blessing Hospital, Quincy, 340 bed general medical and surgical facility. Pilot 1 floor, then hospital wide. Evaluation period unstated</td>
<td>Mixed method Evaluation of number of calls per month. Summary of family satisfaction with programme. Evaluation of patient survival from code to discharge. Analysis processes not described</td>
<td>Family Activation RRS Family education on admission, posters throughout facility, ongoing support to communicate concerns to staff. Consistent process and scripts used, staff taught how to support families and activate team. Integrated education for medical and nursing staff</td>
<td>No statistical outcomes stated. Decrease in non-ICU codes. Increased patient survival after code to discharge. Increased knowledge on whom and how to call. Call reason: worried about pt. Families expressed increased satisfaction. Education allayed staff fears of inappropriate family activation.</td>
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<tr>
<td>Odell et al. (2010), Reading, UK</td>
<td>Evaluation of patient and family system access to Critical Care Outreach (CCO) team</td>
<td>District general hospital. Southern England 808-bed. Initial six month project (September 2009-March 2010). Tracking of 147 adult patients transferred from ICU to general wards</td>
<td>Mixed method Practice- development enterprise. CCO, ICU and consumers informed design. Consumer survey, interview and stakeholder event. Staff-surveyed knowledge, attitudes and concerns. Context Assessment Index (CAI) tool evaluated by CCO team. Descriptive statistics and qualitative comments</td>
<td>Call for Concern (C4C) Based on Condition H(elp). Consumers encouraged to call CCO team when concerned about a patient. CCO team undertook pretransfer visit (verbal and written info re process for pt. and family) and 24 hours post-transfer from ICU (verbal and resource pack with printed info and phone access)</td>
<td>Twelve calls (av. 2/month). Two calls leading to prevention of deterioration. One transfer to HLOC. Twenty-six patient/family feedback forms (17.7%). 21 (80.7%) felt adequate info. given and 23 (88%) felt reassured by service available. Call reasons: pain management, plan/coordination of care, shortness of breath, worried about pt. and dissatisfied with staff response. CAI tool viewed positively by CCO team. Initial staff concerns of potential for inappropriate calls, Increased workloads and undermining of skill. Concerns allayed by CCO team.</td>
</tr>
<tr>
<td>Study</td>
<td>Aim</td>
<td>Setting and sample</td>
<td>Research design/methods</td>
<td>Programme name, content and implementation</td>
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<td>Zix et al. (2012) Ohio, USA</td>
<td>(i) No. and nature of family-activated Medical Response Team (MRT) calls. (ii) No. of activations by staff prompted by family concerns</td>
<td>Cincinnati Children's Hospital. 598 bed. Initial 5 years of programme (October 2007–2012). Family-activated and family prompted staff-initiated MRT calls</td>
<td>Mixed method Retrospective cohort study. Time series data of MRT activations on run charts; associations between exposure and outcomes; semi-structured chart review to obtain reasons for calls. Chi-square tests and descriptive statistics</td>
<td>Family-activated MRTs Pre-existing MRT, family activation added. Family education about MRT in unit orientation. Posters mapping process in each pt. bedroom</td>
<td>36 calls mean of 1.9 calls/quarter (0.6/month). Family prompted staff calls increase–1 to 11 calls/quarter (0.3–3.7/month). Fifty-eight per cent of family-based calls led to HLOC. Final 7 months – 0.7% MRT calls family-activated and 7% family based staff calls. Reasons for calls: condition change, plan/coordination of care, dissatisfaction with staff. Initial staff concerns incl. extra time, non-clinical concerns and excessive MRT calls</td>
</tr>
<tr>
<td>Baird and Turbin (2011) Michigan, USA</td>
<td>To establish the number and nature of Condition Concern calls provided by pts and families</td>
<td>3 Spectrum Health Hospitals Adult &amp; paediatric inpatient units. 1061 beds. Initial 6 months of programme (July 2009–December 2009)</td>
<td>Mixed method Condition Concern Audit Tool used SBAR to: Identify patient and family/friend reason for call; track volumes of calls over time and identify any concerns. Descriptive statistics</td>
<td>Condition Concern Pre-existing RRS in hospitals. Education packets and small group sessions provided for programme management teams. Education of staff, consumer education on admission. Programme sign on wall opposite pts. beds</td>
<td>69 calls (11.5/month) 0 calls resulted in RRS intervention. Satisfaction tied to rapid resolution of concern. Major call concerns, pain management, plan/coordination of care, dissatisfaction with staff. Positioning of signage successful. Initial consumer anxiety over staff retaliation</td>
</tr>
<tr>
<td>Bogert et al. (2010) California, USA</td>
<td>To evaluate pts. and family activation of Condition H calls to rapid response teams</td>
<td>St. Joseph's Hospital (Magnet community hospital). 500-bed. Pilot-1 unit (6 months 2007), then hospital wide. Initial 13 weeks of programme (March 2008–June 2008)</td>
<td>Mixed method Evaluation of programme outcomes using IOWA Model of Evidence-Based Practice. Evaluation of number of consumer calls, awareness and understanding of programme. Descriptive statistics and qualitative comments</td>
<td>Condition H Pre-existing RRS. Staff prepared by manned mobile cart incl. flyers, posters and Josie King video, 1:1 education. Staff reviewed consumer brochure and any concerns addressed. Patient and families received brochure, FAQ sheet and 1:1 education. Emergency viewed differently by staff and patient/families and nurse coaching suggested</td>
<td>Eight calls (2.46 per month) 0 calls required RRS intervention. One call related to potential clinical deterioration. Consumers expressed increased programme knowledge and satisfaction. Major reasons for calls: communication issues, plan/coordination of care, pain management. Emergencies viewed differently by staff and patient/families and nurse coaching suggested</td>
</tr>
<tr>
<td>Dean et al. (2008) Pennsylvania, USA</td>
<td>Outcome analysis following implementation of Condition Help programme</td>
<td>Children’s Hospital of Pittsburgh (University of Pittsburgh Medical Centre affiliated hospital). 296-bed. Initial 2 years of programme (September 2005–August 2007)</td>
<td>Mixed method Evaluation of patients and parents responses regarding types of concerns and number of calls. Descriptive statistics</td>
<td>Condition HELP Education by admitting nurse reinforced with brochure, video and example calls. Telephone number displayed on consumer brochure and posted in pt’s room. SBAR used to relay information from team to unit Dr. and each incident reviewed</td>
<td>42 calls (1.75/month). No. of calls to RRS unstated. Parents/patient calls not separated. Major reasons for calls: communication breakdown (42 calls). Plan/coordination of care (15 calls); pain management (six calls); discharge (six calls); dietary status (six calls) and delays in service (six calls)</td>
</tr>
<tr>
<td>Study</td>
<td>Aim</td>
<td>Setting and sample</td>
<td>Research design/methods</td>
<td>Programme name, content and implementation</td>
<td>Major findings</td>
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<tr>
<td>Dunning et al. (2010)</td>
<td>To evaluate outcomes of implementing a 'Family-Activated Safety Team' within the RRS</td>
<td>Virginia Mason Medical Centre 336-bed. Initial 16 months of programme (June 2008-September 2009)</td>
<td>Quantitative Calls made by family, pt. or friend. Reasons for calls and subsequent intervention. Direction how to activate and concerns addressed. Descriptive statistics</td>
<td>FAST (Family-Activated Safety Team) programme based on University of Pittsburgh Medical Centre Shadyside. Programme incorporated FAST brochure for consumers to explain the programme, script for admitting nurses to educate consumers on, information for managers, outlining staff education incl. video, information huddles, intranet information</td>
<td>30 calls, (19/month). Fifty-six per cent family member/friend, 30% pt., 14% unknown. Nil RRS call activation. One call led to HLOC. Consumers 85% clear direction to activate. Eighty-five per cent felt concerns addressed. Call reasons: pt. perceived delay in care (50%), pain control (37%), plan of care (23%), conflict with staff (23%), communication issue (23%), medication needs</td>
</tr>
<tr>
<td>Greenhouse et al. (2006)</td>
<td>To report outcomes following implementation of Condition H</td>
<td>University of Pittsburgh Medical Centre Shadyside 520-bed. Pilot-24 bed cardiology unit, then hospital wide. Initial 9 months programme (May 2005-January 2006)</td>
<td>Mixed method Evaluation of pts. and family responses regarding types of concerns (by interview) and no. of calls. Staff concerns prior and following programme. Descriptive statistics and qualitative comments</td>
<td>Condition H(elp) Consumers receive guidelines, telephone number and programme explanation by nurse on admission. Calls routed to pt. relations coordinator. Team review of call, visit by pt. relation coordinator 24 hours post event. Hospital adopted SBAR to promote staff communication</td>
<td>Twenty-one calls (2.3/month). Nil calls averted a health crisis or saved a life. Consumers expressed satisfaction with programme. Call reasons: communication incl. plan/coordination of care (most calls), pain management (five calls), delayed assessment (two calls) and mistaken activations (three calls). Staff held initial concerns re. Nonemergency calls and implications of call activation for nurse - review lessened concern</td>
</tr>
<tr>
<td>Hueckel et al. (2012)</td>
<td>To evaluate family teaching and understanding of Condition Help programme</td>
<td>Duke Children’s Hospital 186 bed. Two units: (i) 74 bed Pediatric Care Unit (ii) 16 bed Paediatric Bone Marrow Transplant Unit Initial 12 week of programme (January-March 2011)</td>
<td>Mixed method Quality improvement project. Surveys evaluated family-participation, knowledge of programme, reasons and how to call. Descriptive statistics</td>
<td>Condition Help(H) Two units chosen for differing populations and level of readiness for education. (i) Nurse initiated discussion using script on admission. Pt. and family member given flyer, call example and telephone number on communication board. Sticker denoted education in pt’s record. (ii) Nurse initiated discussion using script during stay. Teaching documented in pt’s record</td>
<td>Two calls (0.67/month). Nil calls required transfer to HLOC. Five additional staff calls -indicated increase (1.67/month). (i) 87 (81%) survey completion. Eighty-five (98%) aware of programme. 66 (76%) knowledge of how to call. 64 (74%) knowledge of reason to call. (ii) 32 (88%) survey completion. 32 (100%) aware of programme, 31 (99.7%) knowledge of how to call. 32 (100%) knowledge of reason to call. Call reason: Clinical signs identified by Drs</td>
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</table>
framework, integrating a colour coding method was used. Findings were read and reread to become familiar with similar outcomes across the studies. Coloured stickers (red, blue, yellow, green) identified four emerging themes across the findings of the studies. These major themes were then analysed in detail. Three to four sub-themes were identified by smaller colour-coded dots within each theme. The major themes and sub-themes were refined through a cyclical process of checking for accurate interpretation of the findings of each study. Both authors verified that the final themes represented an accurate analysis and summary of the results of the studies (Table 5).

Results

The four major themes were titled: 'Call activation and outcomes', 'Consumer knowledge and satisfaction with programme', 'Programme content' and 'Staff concerns and satisfaction with programme'. Numerical evidence from the studies that informed these themes was also summarised (see Table 6).

Table 4 (Continued)

<table>
<thead>
<tr>
<th>Study</th>
<th>Aim</th>
<th>Setting and sample</th>
<th>Research design/methods</th>
<th>Programme name, content and implementation</th>
<th>Major findings</th>
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<tr>
<td>Ray et al. (2009)</td>
<td>North Carolina, USA</td>
<td>North Carolina Children's Hospital. 140 bed (University of North Carolina affiliated Hospital). Pilot-2 units, then hospital wide. Initial 2 years of programme (April 2007–April 2009)</td>
<td>Quantitative data only reported. Random in person surveys of awareness, knowledge of programme, how it worked and when activation should occur. Audit of actual calls followed by consumer satisfaction evaluation. Descriptive statistics</td>
<td>Two calls (0.03/month). 24 calls/1000 discharges. 16 calls/1000 discharges in 12 months prior programme. Family concern reason for 5% of all calls. Increased staff calls (often due to consumer related concern). All family calls required transfer to HLOC. Two hundred and seventy-six family understanding, av. Twenty-seven percent knowledge of when and how to activate RRS. Call reason: Clinical criteria identified by Dr. shortness of breath, worried about pt. Staff fears of over-utilisation allayed.</td>
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Increase in staff-activated calls was also noted following implementation of the family-activated components of RRS in four studies. The impact on the number of pre- and poststaff-activated calls varied from relatively small (2.34/month) to a large increase in number (146 calls/month) (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4). Gerdik et al. (2010), Zix et al. (2012), Hueckel et al. (2012) and Heickel et al. (2012) indicated an increase in number of RRS calls activated by staff in response to family concerns. Also, in the four studies (see Table 4).
Table 5 Themes and sub-themes that emerged from the findings of the studies

<table>
<thead>
<tr>
<th>Themes and sub-themes</th>
<th>Number of studies per sub theme</th>
<th>Empirical sources</th>
</tr>
</thead>
<tbody>
<tr>
<td>Call activation and outcomes</td>
<td>Number of patient- and family-activated calls</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Increase in staff-activated calls</td>
<td>4</td>
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<tr>
<td></td>
<td>Transfer to HLOC</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Mortality pre- and postconsumer call activation</td>
<td>2</td>
</tr>
<tr>
<td>Consumer knowledge and satisfaction with the programme</td>
<td>Consumer knowledge on whom, how and/or when to call</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Consumer reasons to call</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Consumer satisfaction with programme</td>
<td>7</td>
</tr>
<tr>
<td>Delivery of education programme on consumer involvement in RRS</td>
<td>Education and training of staff</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Consumer education by nurses</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>Mode of information delivery to consumers</td>
<td>11</td>
</tr>
<tr>
<td>Staff concerns with consumer involvement in programmes</td>
<td>Inappropriate calls overwhelming system</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Increased workload of staff</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td>Undermine health professional’s judgment</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Staff confidence and receptivity to change in programme</td>
<td>2</td>
</tr>
</tbody>
</table>

Transfer to higher level of care
The impact of consumer-related RRS calls on subsequent patient transfers to HLOC was identified in five studies. A wide range was noted: Hueckel et al. (2012) revealed 0 of 2 (0%), Dunning et al. (2010) detected 1 of 30 (3.3%), Odell et al. (2010) identified 1 of 12 (8.3%), Zix et al. (2012) noted 9 of 36 (25%) and Ray et al. (2009) found 2 of 2 (100%) required subsequent patient transfer to HLOC. An increase in patient transfers to HLOC (from 12.8–45.4/month) through an undifferentiated combination of staff and consumer-activated RRS calls was also noted by Gerdik et al. (2010).

Mortality pre- and postconsumer call activation
Decreased mortality and non-ICU code numbers were found following the introduction of consumer activation...
within RRS calls in two studies. Gerdik et al. (2010) revealed a decrease in mortality with a reduction in deaths from 31 per 1000 discharges (RRS programme alone) to 22.9 per 1000 discharges (RRS programme with consumer activation) along with a decrease in non-ICU code numbers. Bybee (2008) also noted a decrease in non-ICU code numbers and increased patient survival following codes (however no statistics were included).

**Theme 2 – consumer knowledge and satisfaction with the programme**

Evidence of consumer knowledge, their reasons to make RRS calls and satisfaction with the programme following their inclusion in RRS were found in 11 studies.

**Consumer knowledge on whom, how and when to call**

High levels of consumer knowledge in relation to whom, how and when to activate a RRS call were identified in five studies. Consumers reported high levels of understanding of information given to them i.e. 89–100% (Gerdik et al. 2010) and 80% (Odell et al. 2010). Similarly Hueckel et al. (2012) revealed high levels of knowledge of how to call (76–99%) and reasons to call (74–100%).

Contrastingly, Bogert et al. (2010) identified a lower increase in patient/family knowledge (20–67%). Ray et al. (2009) also revealed poor average consumer understanding (27%) with wide variation (6–58%) of when and how to activate the RRS. Dunning et al. (2010) found an interesting divergence in results; while 85% understood how to activate initially, 18% proceeded to indicate poor recall.

**Consumer reasons to call**

Management/communication of care and perceived clinical deterioration were the most common reasons given by consumers activating an RRS call. Management/communication of care incorporated interrelated reasons; pain management and plan/coordination of care being the most identified (Greenhouse et al. 2006, Dean et al. 2008, Bogert et al. 2010, Dunning et al. 2010, Gerdik et al. 2010, Odell et al. 2010, Baird & Turbin 2011, Zix et al. 2012).

Communication issues often emerged as the reason for other care concerns as well (Greenhouse et al. 2006, Dean et al. 2008, Bogert et al. 2010, Dunning et al. 2010). Dis-satisfaction/conflict with staff responses and delays in service/assessment concerns were also noted (Greenhouse et al. 2006, Dean et al. 2008, Dunning et al. 2010, Baird & Turbin 2011, Zix et al. 2012).

Interestingly, consumer concern about patient condition was often expressed as ‘something doesn’t feel right’ while shortness of breath was the most described individual symptom (Ray et al. 2009, Gerdik et al. 2010, Odell et al. 2010). Consumers appreciated increased knowledge of potentially changing physical signs as taught by medical staff (Ray et al. 2009, Hueckel et al. 2012, Zix et al. 2012).

**Consumer satisfaction with the programme**

When measured, overwhelming numbers of positive consumer responses were noted. Callers expressed satisfaction,

A high rate of consumer satisfaction (84–100%) was noted with the programmes (Greenhouse et al. 2006, Bogert et al. 2010, Dunning et al. 2010, Gerdik et al. 2010, Odell et al. 2010). While percentages were unstated, families again expressed satisfaction with the knowledge that they could contact the RRS (Bybee 2008, Baird & Turbin 2011).

Theme 3 – delivery of education on consumer involvement in RRS

The delivery of education to staff and consumers on consumer involvement in call activation of the RRS was discussed in 11 studies. The sub-themes encompassed ‘Education and training of staff’, ‘Consumer education by nurses’ and ‘Mode of information delivery to consumers’.

Education and training of staff


Comprehensive staff education initiatives, where education packages were developed, were popular (Bogert et al. 2010, Baird & Turbin 2011, Hueckel et al. 2012). Additions to these packages included, checklists, reminders and programme talking points, mobile carts, power point presentations, communication with RRS team coordinators and completion of self-learning modules. The ‘Josie King Story’ video was also used to further inspire hospital staff (Bogert et al. 2010 and Dunning et al. 2010).

Programmes integrated a range of communication techniques when educating staff; one-to-one and small group meetings, shift change huddles and personal communications. Gerdik et al. (2010) successfully undertook staff wide education with a communication toolkit based on ‘Zespy’s Safest in America’ patient safety programme. Staff members were often taught through scripted narratives to confidently deliver comprehensive consumer call information (Bybee 2008, Ray et al. 2009, Dunning et al. 2010, Gerdik et al. 2010, Hueckel et al. 2012).

Displays using hospital unit bulletin boards proved to be an effective approach along with integrated monthly newsletters, weekly news briefs and intranet education to activate staff learning (Dunning et al. 2010, Gerdik et al. 2010, Hueckel et al. 2012).

Consumer education by nurses


All studies taught ‘concern’ about the patient as a criterion for consumer calls, however, only two educated on specific physical signs and symptoms (Greenhouse et al. 2006, Ray et al. 2009). Common signs were heart/respiratory rate, blood pressure, mental status, agitation, oxygen saturation, seizure, chest pain, colour, loss of face, arm or leg movement/weakness.

Daily rounds and information sheets with frequently asked questions (Bogert et al. 2010) were used to educate consumers. Provision of verbal and written information with reiteration by nurses also assisted consumer comprehension (Odell et al. 2010). Ongoing encouragement of consumers to relay any concern was advocated (Bybee 2008). Gerdik et al. (2010) also normalised the activity, referring to activation as being similar to calling 911 from home.

Hueckel et al. (2012) highlighted the need for a short follow-up survey to evaluate the understanding of the programme and to provide opportunity for re-education. These authors indicated that the use of additional educational opportunities following admission enhanced information retention (timing dependent on each unit’s culture).

Only Ray et al. (2009) addressed education needs of people who did not speak English. Information was given through a translator upon admission with cards provided in Spanish to hand to an English speaking person for RRS call activation. Additionally, Ray et al. (2009) recommended electronic chart reminders with nurse explanations as a critical part of educating families.

Mode of information delivery to consumers

Patients and families were provided with printed educational materials and verbal instruction on consumer call activation/rapid response programmes (all studies). Mode of delivery included initial nurse explanation along with educational packages, information sheets, posters, flyers, brochures, FAQ sheets and/or video-based approaches (e.g. mobile carts). These materials explained signs to watch for and how to escalate their concern for immediate action (Greenhouse et al. 2006, Bybee 2008, Dean et al. 2008, Ray et al. 2009, Bogert et al. 2010, Dunning et al. 2010,


Posters were developed for consumers to note early signs of patient deterioration. The posters were typically placed throughout the hospital and across hospital beds, enabling easy visibility for the patient and visiting family (Bybee 2008, Gerdik et al. 2010, Baird & Turbin 2011, Zix et al. 2012). English and Spanish language tear-off cards were located in all bed units for English- and Spanish-speaking visitors (Ray et al. 2009).

Studies provided consumers with customised videos, detailing rationale and case scenarios of activation. Service-related issues that should not be managed via programme activation were identified (Dean et al. 2008, Bogert et al. 2010, Dunning et al. 2010). Greenhouse et al. (2006) and Ray et al. (2009) planned future additions to admitting information with television-based patient education. Gerdik et al. (2010) described the usage of phones labelled with stickers to provide instructional steps on call activation.

Theme 4 – staff concerns with consumer involvement programmes

Identification of initial concerns shared by nursing and medical staff before introducing the consumer involvement programmes emerged as important (considered in six studies). Sub-themes included ‘Inappropriate calls overwhelming the system’, ‘Increased workload of staff’, ‘Undermine health professional’s judgment’ and ‘Staff confidence and receptivity to change of programme’.

Inappropriate calls overwhelming system

The possibility of inappropriate call activation was a common concern among medical and nursing staff prior to RRS programmes in six studies (Greenhouse et al. 2006, Bybee 2008, Ray et al. 2009, Gerdik et al. 2010, Odell et al. 2010, Zix et al. 2012).

The initial concern of family activation potentially overloading calls and overwhelming the system was described in four studies (Greenhouse et al. 2006, Ray et al. 2009, Odell et al. 2010, Zix et al. 2012). Communication regarding the programme assisted in dispelling staff concerns that consumers would activate for inappropriate reasons (Greenhouse et al. 2006, Bybee 2008, Ray et al. 2009, Gerdik et al. 2010, Odell et al. 2010, Zix et al. 2012). The promotion of ‘no false alarms’ by Ray et al. (2009) assisted staff in appreciating any serious family or patient concern as a valid reason for call activation.

Increased workload of staff

Concerns were also voiced regarding the considerable time needed to educate families and patients on the call activation process (Zix et al. 2012). An initial feasibility programme by Odell et al. (2010) determined that increases in the staff workload would not be a factor. Subsequently the ward staff reported minimal increase in workload.

Undermine health professional’s judgment

Physicians and nurses in Ray et al.’s (2009) study were concerned that their management of patient care would be undermined. Nurses emerged more hesitant in relation to implementing the family activation component due to perceived loss of control.

Nurses highlighted a fear of subsequent scrutiny of their patient care following family activation (Greenhouse et al. 2006, p. 65). Odell et al. (2010) effectively addressed this concern by emphasising the programme sought to enhance care and not focus on poor staff practices.

Staff confidence and receptivity to change of programme

Staff member confidence and receptiveness to implement a programme change was explored in two studies. Odell et al. (2010) evaluated RRS staff attitudes, using tools to measure clinical team receptiveness to change and knowledge of programme aims. Verbal feedback was sought from other staff involved in consumer-activated calls with ward staff confidence and receptivity remaining unknown (Odell et al. 2010). Low levels of ward staff understanding and comfort with the programme followed Bogert et al.’s (2010) initial in-service education (staff members had difficulty educating consumers). Subsequent compilation of a sheet of frequently asked questions aided staff confidence and improved information delivery.

Discussion

The following findings from the review appeared to be particularly pertinent. The consumer role in ‘universal awareness’ of at-risk/deteriorating patients (Hillman et al. 2014, p. 520) was effectively demonstrated by Gerdik et al.
(2010), revealing a substantial decrease in deaths. Also a decreased number in non-ICU codes (Bybee 2008, Gerdik et al. 2010) and increased survival following codes to discharge (Bybee 2008) was noteworthy. These results have the potential to persuade national policy makers and major health care organisations to adopt consumer call activation into RRS (e.g. Australian Commission on Safety and Quality in Healthcare 2012).

Clear programme content including when, to whom and how to report consumer concern emerged as important. This review identified a range of criteria for call activation. Subjective concern-based criteria focused on change in patient condition; physical-based criteria were used to guide consumers in only two studies. The lack of focus on physical signs was surprising given the importance of changing vital signs in the deteriorating patient (Cretikos et al. 2008). Clear guidance on call criteria that included physical signs, particularly respiratory rate (Hillman et al. 2014) and level of consciousness (Sandroni & Cavallaro 2011) in consumer-activated criteria appeared to be warranted.

Results showed successes relied heavily upon effective hospital consumer education. Consumers appeared to struggle with absorbing large quantities of information upon admission alone. Multiple modes of delivery reinforced the information initially provided on admission (e.g. through posters, brochures and DVDs). Effective development of consumer education materials appeared to be critical. Close collaboration between consumers and health professionals has been called for (Oresland et al. 2015) and could be used in the development of educational materials for consumer involvement in RRS programmes. While consumer advisory groups were used they did not appear to drive the content of the materials developed in the studies.

Significantly, transmission of consistent information with active listening from health professionals to consumers emerged as critical to success. Potential difficulties in maintaining consistent, effective consumer education because of staff variation and multiple responsibilities on admission could occur. Health professional education on content and delivery of materials to consumers was an important aspect that should be addressed concurrently with the introduction of any RRS consumer call-activation programme.

Translation of educational materials for consumers from non-English speaking backgrounds (Ray et al. 2009) has been sadly neglected. Further research involving cultural and linguistically diverse groups in developed countries in the development of educational materials should therefore be considered.

Evaluation of consumer education programmes also emerged as important. High level consumer satisfaction with involvement was universally noted. However, high levels of perceived consumer knowledge were demonstrated in under half of the reviewed studies; one indicating a widely swinging variation in consumer knowledge (Ray et al. 2009). Interview (rather than survey) emerged as the optimum method to determine consumer knowledge to provide greater participation and feedback to improve all aspects of subsequent programmes.

The consumers’ most common reasons to call related to management and communication surrounding care. These concerns focused on: worry about a change in the patient’s condition and/or physical signs; pain management; concerns regarding the plan/coordination of care; dissatisfaction with staff response and delays in service. These consumer concerns emerged as well-founded, clearly supporting the view that calls made by consumers rarely produced unrelated RRS calls.

Staff expressed concern over the potential loss of control of their patients and a fear of having their own health care judgments in three studies. Repeated education on the importance of the programmes’ potential to save lives and to dramatically increase consumer sense of security reduced staff concern. Staff concerns related to inappropriate calls overwhelming the system and increasing workloads were also allayed. Call volumes occurred at one to two per month dependent on facility or unit size. Few mistaken call activations ensued and no reports of calls overwhelming the hospital systems were reported. Rather, consumer calls often led to vital patient transfers to HLOC again indicating the value of consumer activation in the RRS.

Consumer call activations led to an interesting increase in staff-activated calls, often described as being related to family concerns. Implementation of consumer-activated RRS teams established greater emphasis on partnerships between consumers and health professionals, encompassing family-centred care. The review showed nursing and medical staff to be more inclined and confident to call with patient and/or family support. Consumer support also appeared to be a potentially mitigating factor against other socio-cultural barriers (Jones et al. 2009) increasing the likelihood of nurses activating RRS calls.

While ICU staff confidence was evaluated by Odell et al. (2010), some studies considered building ward staff confidence through scripts, check lists and educational packets. Staff members clearly gained confidence from ongoing communication when faced with new consumer involvement programmes (e.g. email, one-to-one, group huddles/meetings with programme leaders). In the absence of investigation into ward staff receptivity to implement RRS
programme change to involve consumers, further research into this aspect may be warranted.

**Strengths and limitations**

This review was limited by the number of relevant research studies (11) published post 2006 in English that focused on family/patient activation of a RRS. These studies were frequently published with limited information on aims, research design, data collection tools and analysis methods. Patient populations, settings (e.g. units, floors and hospitals) and length of the study period following implementation of the RRS consumer activation programmes also varied across the studies. Most research designs employed simple measures of patient outcome and survey data before, during and after programmes. Findings, therefore, should be viewed with caution in relation to generalisability to other settings or populations. However, similarity in acute care hospital settings, acuity of patient populations, findings and conclusions do imply potential transferability to other comparable organisations.

**Relevance to education and clinical practice**

Consumer concerns emerged as well-founded with consumer activation unlikely to produce unrelated or excessive RRS calls, often leading to vital patient transfers to HLOC. Overall patient outcome data have offered persuasive results for widespread adoption of RRS consumer call activation.

Consumer education materials need to be developed through collaboration between consumers and health professionals. Careful consideration of consumer call criteria emerged as clearly warranted. Further rigorous research should be undertaken to establish the most effective ways to introduce these programmes to consumers and maximise their efficiency. Future research will also be required with major cultural and linguistically diverse groups to develop a range of relevant language-related education materials.

Evaluation of consumer knowledge and confidence may be best served by the use of interview to encourage greater participation and feedback on all aspects of these programmes. Further development of knowledge and confidence survey tools would assist the quality improvement feedback cycle to continually enhance programmes.

Effective and ongoing education of all health professionals in the content and delivery of the educational materials may increase ward staff confidence and receptivity to implement consumer call activation in the RRS programme. Initial resistance from health care professionals appeared to fade and be replaced by greater valuing of consumer-activated programmes. Nursing and medical staff appeared to become more confident and likely to place RRS calls with the additional patient and/or family support. These partnerships provide an additional safety net for vulnerable patients; improve care and increase consumer satisfaction.

**Conclusion**

The findings of this review indicated limited literature informing this poignant topic. It appeared that the success of consumer-activated RRS programmes lay largely with effective and ongoing staff education, regular consumer education by staff and effective resource materials. Each programme must be tailored to the particular facility with a clear focus on open communication, consumer and staff feedback to optimise effectiveness.

It was important to note that health care professionals in any facility were likely to be concerned that programmes might provoke unnecessary RRS consumer calls. It was reassuring that evidence indicated few inappropriate calls occurred and they do not overload the RRS or individual staff workloads.

Findings indicated increased staff and consumer calls resulted in earlier intervention for patient deterioration, with or without transfer to HLOC, improving patient outcomes. Given their proven capacity to reduce mortality rates within hospitals, it can be concluded that consumer involvement can play a potentially important role in RRS programmes.

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No conflict of interest has been declared by the authors.
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