## **Table 2** Summary of reviewed papers

|  | Reference | **Participants & Setting** | **Study Design** | **Key study findings** | **Strengths & limitations** |
| --- | --- | --- | --- | --- | --- |
| 1 | Gilligan, 2007MedlineCINAHL**Themes****Bed management*** **d/c**
* **eliminate OL**
* **pt safety**
 | UK, 650 bed hospital on 2 sites | QI, 3 interventions to reduce OL # | Pull not push ED disposition to ward through ward D/C facilitates flow.*Physician practice:* daily rounds by 'outlier physician of week', decreased bed days for pt by 1.72days. 42 beds removed*Facilitate D/C* discharge facilitator introduced, planning dc dates, am dc over pm dc. *Bed management* reduce bed # keep staff # same to improve efficiency and throughput. Introduce quick & sick ward- this reduced OL by having a ward for unwell pt's. (as hospital on 2 sites 1= med, 2 = surg + Crit care, all unwell med pts sent to Site 2 were outliers)Reduction in deaths (22.9 to 17.8/week in ED admits when zero OL) at same time as OL numbers fall. However, readmission rose by almost 50% | Strengths LimitationsHard to track what caused results with multiple changes implemented at one time.  |
| 2 | Harrison,2013MedlineCINAHLProQuest**Themes****-occupancy impact flow****-d/c** | 300 bed University teaching hospital SA. Pt data from 642 days starting 30/6/2010 | Hospital data review & analysis | This paper measures separation rates and the impact of patient load and over-census on separations.Per-capita separations increase on over-census days,(8 more d/c compared to non-over-census days) mostly for pt’s with >10 day admit.- particularly for medical patients, not reflective for surg pt’s. Surg responded more to higher occupancy rate than Mx. Higher patient load is a barrier to d/c patients- strategies to manage this = d/c planners, transition care planners.  | Strengths Model computes per-capita separation rate for each admissions > 1 day rather than an average of length of stay. LimitationsSingle site |
| 3 | Reid, E. 2015**Themes*** **dc (why pt stay longer)**
* **reasons stay longer**
 | The Day-of-Care Survey (DoCS) was used between March2012 and December 2013 to survey 3,846 acute hospital beds innine hospitals internationally | Real time data from case records and bedside charts to assess the patient’s status against severity of illness and service intensity criteria. | Important implications for Pt Flow & bed availability with reasons why pt’s are not d/c; awaiting consultant r/v, wait for allied health r/v, wait test/result to step down from acute care.  | Strengths Limitations |
| 4 | Thompson, S. 2009is looking at developing a computation for improved efficiency not human DM. **Themes*** **anticipate demand preempt pt movement**
* **pt safety**
 | Windham Hospital in Willimantic, Connecticut.decision-support system (DSS) for the bed manager to allow for pre-emptive (prior to surge) transfers of patients between ﬂoors, and for the assignment of patients to ﬂoors based partially on capacity considerations | Developed and implementeddecision-support system based on the optimization model. develop a method to improve the efﬁciency of capacity allocation  | The model has been integrated into a DSS that has been implemented and, based on an initial trial period, is projected to result in very signiﬁcant ﬁnancial gains of about $600,000 per year, or 1% of total revenue & 50% reduction in time to wait for IP bed. No negative impact resulted on any standard quality of care or stafﬁng effectiveness indicators. In addition, there was a marked improvement in quality of care because of a resulting decrease of almost 50% in the average time that an admitted patient has to wait from admission until being transferred to a ﬂoor. Based on this success, WCMH decided to create an “operations manager” position, to be ﬁlled by an individual who will work with the system and will also identify other opportunities to improve patient ﬂow and hospital efﬁciency.Assigning patients based on the recommendations provided by the DSS also improved capacity utilization. | StrengthsLimitationsPatients were categorised based on the floor they should ideally be admitted to rather than a diagnosis. This cat. also assigned their LOS & expected financial reimbursement.This was implemented for a period of 18 days |
| 5 | Villa-Roel, C. 2012**FT**ED Overcrowding not ward- no OL. **Themes*** **FCP access block**
 |  | RV summarising outcomes associated with Full Capacity Protocol (FCP) as a solution to ED overcrowding.  | One abstract included- ED & hospital LOS decreased when FCP implemented.One paper that was in discussion and not in results discussed the admission of patients into hallways- monitored but no ICU Pts. Whenever ED overcapacity by 2 patients, boarded patients were moved to in patient care spaces. 2-h rule: maximum for ED assessment, 2 h maximum from the decision to admit, 2 h maximum to transfer patients to inpatient spaces. | Strengths Selection bias – multiple reviewers + quality scoring system. LimitationsThe 1 study that met criteria was abstract only with missing data.  |