Acute Take: Low frequency-high volume versus high frequency low volume.
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Introduction
Traditional ‘on-take’ models result in potentially large numbers of patients being admitted under one receiving sevice over a 24 hour period. Our tertiary referral university teaching hospital historically operated a 1:9 on-take rota for acute unselected internal medicine with median admissions of 22/ 24 hours (range 15-43). In April 2016 four of the firms moved to a new model of ‘distributive take’ where they shared admissions between the 4 firms on each of their four post take days in the cycle.

Aim: To compare high frequency low volume take (distributive model) to low frequency high volume (1:9) with respect to discharge efficiency and cost.

Methods
Data on demographics, length of stay (LOS) and cost of admission was obtained from the hospital inpatient enquiry administrative database and finance department. Data was obtained for one year pre and post the system change (01.04.2015-31.03.2017). Data was analysed using Microsoft Excel. Probability of death and discharge on days 1 to 30 were calculated on a subset of both groups (n=1367 1:9 n=1418 distributive). To account for positive skew cost data was calculated into it’s natural log and the mean per diem cost was calculated.

A Markov model was calculated in Treeage TM to examine differences in cost and bed day use between the 1:9 and distributive groups. The model was run on daily cycles with a 30 day time horizon. A Monte Carlo simulation was run 1000 times to give a mean cost and establish the variation around it. The model allowed patients to be admitted to either the distributive or 1:9 arms. 3 health states exist- in-patient; discharge; death. In each cycle patients move into one of these states based on the real world admission data.

Results
There were 1,841 ‘1:9’ episodes and 3,048 under the distributive model. There were no significant age:sex differences. Average LOS reduced from 11.4 to 10.6 days. There was a higher probabbility of discharge at days 3 (40% v 36%) and 5 (55% v 51%) under the new model. There was no difference observed for 30 day inpatient mortality between the 2 groups (3.5% v 3.8%) The mean cost for an admission was €5,237 (SD €1,668) for distributive take vs €5477 (SD €1,843) fr the 1:9 model. Average cost saving was €240 per episode of care under distributive model. When extrapolated to the 3,048 episodes of care a mean cost saving of €731,520 was realised.

Discussion
There is no clear consensus on the optimum number of inpatients a medical firm can manage. Inpatient census reflects the interaction of admission number and length of stay. This study indicates that taking smaller number of admissions more frequently results in improved early discharge rates with concomitant cost savings.