# G.13 Nurtitional interventions

**Review question: What is the clinical and cost effectiveness of nutritional interventions in people with cystic fibrosis?**

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Full citation<br>Powers, S. W., Stark, L. J., Chamberlin, L. A., Filigno, S. S., Sullivan, S. M., Lemanek, K. L., Butcher, J. L., Driscoll, K. A., Daines, C. L., Brody, A. S., Schindler, T., Konstan, M. W., McCoy, K. S., Nasr, S. Z., Castile, R. G., Acton, J. D., Wooldridge, J. L., Ksenich, R. A., Szczesniak, R. D., Rausch, J. R., Stallings, V. A., Zemel, B. S., Clancy, J. P., | Sample size<br>N=78<br>intervention: N=36<br>control: N=42<br><br>Characteristics<br>Children with CF and pancreatic insufficiency<br>Age: 2-6 years. Mean age: 3.8 years<br>Inclusion criteria<br>Confirmed CF diagnosis and confirmed pancreatic insufficiency; at least 6 months post-CF | Interventions<br>Behavioural intervention<br>Individualized nutritional counselling targeting increased energy and fat intake and training in behavioural child management skills.<br>Calorie and fat intake goals were set to meet the minimum 140% of the average estimated energy requirement, with 40% of calories derived from fat.<br><br>Control: educational intervention<br>Education on general nutrition information<br>Education and attention control treatment<br><br>Both groups<br>Both treatments were delivered in person or telehealth (via telephone). Sessions occurred | Details<br>Study setting. Multicentre clinical trial from 7 accredited CF centres.<br><br>Recruitment and randomization. Childr en were identified from a clinical database and reviewing medical records at each CF center. Eligible participants were randomized using a permuted block design for assignment using 2 strata (WAZ score ≤ −1.0 or −1.0 < WAZ score ≤ 1.0). Randomization was based on a computer-generated predetermined | Results<br>Indices of nutrition and growth<br>Mean (SD) change in weight z score at 6 months (post-treatment): Behavioural intervention (N=36): 0.12 (0.40) vs educational intervention (N=42): 0.06 (0.32)<br>Mean (SD) change in weight z score at 18 months: Behavioural intervention (N=36): 0.15 (0.48) vs educational intervention (N=42): 0.11 (0.62)<br>Mean (SD) change in height z score at 18 months: Behavioural intervention (N=36): 0.09 (0.26) vs educational intervention (N=42): -0.02 (0.32) | Limitations<br>The quality of the study was assessed using the Cochrane tool for risk of bias:<br><br>Random sequence generation: Low risk (Eligible participants were randomized using a permuted block design. Randomization was based on a computer-generated predetermined schedule produced by a biostatistician)<br>Allocation concealment: Unclear risk (No details given)<br>Blinding: Unclear risk (Blinding for staff implementing the interventions was not |

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| Behavioral and nutritional treatment for preschool-aged children with cystic fibrosis: a randomized clinical trial, JAMA Pediatrics, 169, e150636, 2015<br>Ref Id<br>406428<br>Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>To test whether behavioural and nutritional treatment (intervention) was superior to an education and attention control treatment in increasing energy intake, weight z score and height z score.<br>Study dates<br>The study was conducted at 7 | diagnosis; no restrictions in consuming a high-fat diet.<br><br>Exclusion criteria<br>Weight z score greater than 1.0 (age and sex adjusted); current use of supplemental nutrition through enteral or parenteral feeding; diagnosis of other conditions or use of current medication known to affect growth; diagnosis of developmental delay; genetic potential for height as acceptable according to the 2002 consensus conference guidelines; and dietary intake exceeding 140%of the | weekly for 8 weeks then monthly for 4 months (6 months).<br>Participants then returned to standard care for 1 year. | schedule produced by a biostatistician and concealed from study personnel until baseline assessment measures were complete.<br>Randomization assignment was supplied via secure email to the study therapist when the participant had met eligibility criteria.<br>Families were aware that there were 2 different behavioral/educational treatments but were unaware of the differences of the specific components of each treatment.<br><br>Data collection.<br>Weight and height were assessed by staff trained by an expert in anthropometry in children using standardized procedures and blinded to the child's treatment group assignment.<br>Children were measured in minimal | Frequency of participants reporting any adverse events related to the digestive system (typically abdominal pain or stool issue) at 6 months: behavioural intervention (N=36): 29 (81%) vs educational intervention (N=42): 21 (50%), p value 0.005<br>FEV1<br>Not reported<br>Quality of life<br>Not reported<br>Pulmonary exacerbations<br>Not reported<br>Adverse effects<br>Not reported<br>Patient and parent or carer satisfaction<br>Not reported | possible; Randomization was concealed from study personnel until baseline assessment measures were complete; Randomization assignment was supplied via secure email to the study therapist when the participant had met eligibility criteria. Families were aware that there were 2 different behavioral/educational treatments but were unaware of the differences of the specific components of each treatment)<br>Incomplete outcome data: Low risk (No drop-outs)<br>Selective reporting: Low risk (Height z score is not reported at 6 months, only at 18 months, however this is consistent with the study objectives)<br>Other bias: Low risk (None identified)<br><br>Other information |

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| CF centers between January 2006 and November 2012.<br>Source of funding<br>Funding for the Families Understanding Nutrition Study was provided by the National Institute of Diabetes and Digestive and Kidney Diseases (grants R01 DK054915-06A1; principal investigator [PI]: Dr Powers and NOT-OD-09-056; PI: Dr Powers), the Cystic Fibrosis Foundation Therapeutics Inc (05A0; PI: Dr Powers). The Families Understanding Nutrition Study was supported by the National Institutes of Health Cystic Fibrosis Core Center (grant | average estimated energy requirement (based on sex, age, and active physical activity level; and intake assessed using 3-day diet recall) | | clothing and without shoes to obtain height andweight. The child'sweight in kilograms,measured to the nearest 100g, was obtained using a digital scale (Scaletronix Inc). The child's height was obtained using a stadiometer (Holtain) and measured to the nearest millimeter. Height was obtained standing unless the child was unwilling to stand, then a supine measurement was obtained (n = 1 at baseline; 2 at posttreatment; and 0 at followup). All measurements were obtained in triplicate and the mean used for analyses. The WAZ and HAZ scores were calculated using the mean measurement and the Centers for Disease Control and Prevention Anthropometric Software Program. For adverse events, symptoms were assessed using | | |

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| P30 DK 27651; PI: Dr Konstan), National Center for Advancing Translational Sciences of the National Institutes of Health (grant UL1TR000077; PIs: James Heubi, MD, and Joel Tsevat,MD, MPH), and, for some of the postdoctoral fellows who contributed to the trial, the National Institute of Diabetes and Digestive and Kidney Diseases (grant T32DK063929; program director: Dr Powers). | | | questionnaires at each treatment session.<br><br>Data analysis. Analyses of WAZ and HAZ change scores were carried out within the PROC GLM procedure (SAS Institute Inc) using an analysis of covariance model with sex, P aeruginosa status at baseline, treatment modality, and baseline value of the corresponding outcome variable as covariates. Frequency of adverse events was disaggregated by body system. Only adverse events related to body systems with 5 or more adverse events were reported. | | |
| Full citation<br>Morton, A., Wolfe, S., Enteral tube feeding for cystic fibrosis, Cochrane Database of Systematic | Sample size<br>People with CF of any age.<br>Characteristics<br>-<br>Inclusion criteria<br>- | Interventions<br>Supplemental enteral tube feeding for one month or longer vs no specific intervention. | Details<br>- | Results<br>No studies were identified for inclusion in this review. | Limitations<br>AMSTAR score: 10/11 (Publication bias was not mentioned)<br>Other information<br>- |

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| Reviews, 4, CD001198, 2015<br>Ref Id<br>451664<br>Country/ies where the study was carried out<br>Study type<br>Cochrane SR<br>Aim of the study<br>To assess if supplemental enteral tube feeding improves clinical outcomes and quality of life in people with CF.<br>Study dates<br>Date of last seach: February 2015<br>Source of funding<br>- | Exclusion criteria<br>- | | | | |
| Full citation<br>Smyth, R. L., Rayner, O., Oral calorie supplements for cystic fibrosis, Cochrane Database of Systematic | Sample size<br>Hanning 1993<br>N= 20<br>20 randomised<br>16 studied<br><br>Kalnins 2005<br>N= 15 participants | Interventions<br>Hanning 1993<br>Intervention: oral calorie supplements<br>Dietary supplements, drink powders, milk shakes, tinned puddings to achieve 25% of normal energy recommendations in addition to normal diet for 6 months | Details<br>Hanning 1993<br>Random allocation using sealed envelopes<br>Parallel design, no intention-to-treat analysis | Results<br>Hanning 1993<br>Indices of nutrition or growth<br>Mean (SD) change in weight (kg) at 6 months: Supplements (N=9): 2.52 (1.33) vs Control (N=7): 1.33 (1.35) | Limitations<br>Smyth 2014<br>AMSTAR score: 9/11 (Publication bias was not mentioned; declarations of interest were only mentioned in relation to the authors of the systematic review |

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| Reviews, 11, CD000406, 2014<br>Ref Id<br>358331<br>Country/ies where the study was carried out<br>Hanning 1993: Canada Kalnins 2005: Canada Poustie 2006: UK<br>Study type<br>Smyth 2014<br>Cochrane systematic review<br><br>Hanning 1993<br>Randomised controlled trial, parallel design<br><br>Kalnins 2005<br>Quasi-randomised controlled trial, parallel design<br><br>Poustie 2006<br>Multicentre randomised controlled trial, parallel design<br>Aim of the study | were enrolled but 2 dropped out.<br>2 out of 7 in the supplement group did not continue taking supplements but they were analysed as ITT<br><br>Poustie 2006<br>N= 102<br>Characteristics<br>Hanning 1993<br>Children and young people with CF<br>Age: 7-15<br><br>Kalnins 2005<br>Participants with CF<br>Age: >10 years. Mean (SD) age on entry to trial: advice group:16.4 years (6.7); supplement group: 19.5 years (11.3).<br><br>Poustie 2006 | Control: usual care<br><br>Kalnins 2005<br>Intervention: Oral calorie supplementation<br>High calorie drink to increase energy intake by 20% of predicted energy needs for 3 months<br>Control: Nutritional counselling<br>Nutritional counselling to increase energy intake by 20% of predicted energy needs by eating high calorie foods for 3 months<br><br>Poustie 2006<br>Intervention 1: Oral calorie supplements for 12 months<br>Intervention 2: Routine dietary advice (usual care) for 12 months | Kalnins 2005<br>Quasi-randomised controlled trial<br>Parallel design<br>ITT was used<br>Study period: 3 months, follow-up: 3 months<br><br>Poustie 2006<br>Multicentre randomised controlled trial<br>Parallel design | Mean (SD) change in weight as % expected for age and height at 6 months: Supplements (N=9): 0.6 (9.77) vs Control (N=7): -2.7 (9.62)**<br>Mean (SD) change in height as % of expected for age at 6 months: Supplements (N=9): 0.1 (24.22) vs Control (N=7): 1.7 (16.38)**<br>FEV1<br>Mean (SD) change in FEV1 % predicted at 6 months: Supplements (N=9): -9.7 (14.3) vs control (N=7): -4.3 (10.54)**<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br><br>Kalnins 2005<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 3 months: Supplements (N=7): 1.46 (2.15) vs Control (N=6): 2.15 (2.59) | but not in relation to the included studies).<br>Hanning 1<br>Random sequence generation (selection bias): Low risk (Random allocation based on a table of random numbers)<br>Allocation concealment (selection bias): Low risk (Used sealed envelopes)<br>Blinding (performance bias and detection bias) (all outcomes): Unclear risk (Investigators performing lung muscle-function tests and athropometry were unaware of the participant's study group)<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (No intention-to-treat analysis. 20 randomised, 16 studied. Four participants did not complete the trial because they found the time demand for testing or the travelling distance to be excessive)<br>Other bias: High risk (The treated group appeared to be in better |

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| Smyth 2014<br>To establish whether in people with CF, oral calorie supplements: increase daily calorie intake; and improve overall nutritional intake, nutritional indices, lung function, survival and quality of life. To assess adverse effects associated with using these supplements.<br><br>Hanning 1993<br>To assess the relationships between nutritional status on the one hand and skeletal muscle strength, power and endurance; and respiratory strength and respiratory endurance on the other in children and young people with CF. To | Children and young people with CF<br>Age: 2 - 15 years<br>Inclusion criteria<br>Hanning 1993<br>> 7 years of age, mild to moderate lung disease. *<br><br>Kalnins 2005<br>< 90% ideal weight for height or 5% reduction in ideal weight for height over 3 months.<br><br>Poustie 2006<br>Children with at least one of following criteria: BMI <25th centile but > 0.4th centile; or no increase in weight over the previous 3 months; or 5% decrease in weight from baseline over a | | | Mean (SD) change in height (cm) at 3 months: Supplements (N=7): 2.17 (2.54) vs Control (N=6): 2.55 (2.36)<br>Mean (SD) change in weight for height (%) at 3 months: Supplements (N=7): 0.71 (4.5) vs Control (N=6): 1.67 (3.33)<br>Mean (SD) change in weight z score at 3 months: Supplements (N=7): 0.1 (0.50) vs Control (N=6): 0.1 (0.57)**<br>Mean (SD) change in weight z score at 6 months: Supplements (N=7): -0.1 (0.57) vs Control (N=6): 0.2 (0.66) **<br>Mean (SD) change in height z score at 3 months: Supplements (N=7): 0.1 (0.70) vs Control (N=6): 0.1 (1.01)**<br>Mean (SD) change in height z score at 6 months: Supplements (N=7): 0.1 (0.66) vs Control (N=6): 0.2 (1.05)**<br>Mean (SD) change in % ideal body weight at 3 months: Supplements (N=7): -1 (5.72) vs Control (N=6): 1 (9.33) **<br>Mean (SD) change in % ideal body weight at 6 | clinical condition at baseline)<br><br>Kalnins 2005<br>Random sequence generation (selection bias): Unclear risk (Quasi-randomised controlled trial: participants were segregated by age and sex, initial participants from each group randomly allocated to intervention or control (paper does not state how initial randomisation occurred), then each subsequent participant was allocated a different group from the previous one)<br>Allocation concealment (selection bias): High risk (Inadequate, used alternate allocation)<br>Blinding (performance bias and detection bias) (all outcomes): Unclear risk (Not possible to blind dietitian or participant - it was stated that apart from the "study monitors" (nurse and dietitian), all other investigators were blinded, but it was not clear whether all |

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| determine the effects of noninvasive nutritional intervention on these indexes early in the course of lung disease. *<br><br>Kalnins 2005<br>To compare the effects of oral dietary supplements with dietary counseling on energy intake and nutritional status in malnourished young people and adults with CF. *<br><br>Poustie 2006<br>To determine whether oral protein energy supplements, used long term in children with cystic fibrosis who are moderately malnourished, improve nutritional and | period of < 6 months.<br>Exclusion criteria<br>Hanning 1993<br>Receiving supplemental tube feeding or total parenteral nutrition. *<br><br>Kalnins 2005<br>Patients with CF-related diabetes, a gastrostomy tube, CF-associated liver disease, FEV1 < 30%, O2 dependence, and those already receiving routine supplements. *<br><br>Poustie 2006<br>Children were excluded if they had cystic fibrosis related diabetes or liver disease or FEV1 < 30% or if, during the previous three | | | months (3 months after the end of the intervention): Supplements (N=7): -3 (5.73) vs Control (N=6): 0 (9.33) **<br>FEV1<br>Mean (SD) change in FEV1 (% predicted) at 3 months: Supplements (N=7): -6.6 (14.6) vs Control (N=6): 1.6 (13.3)<br>Mean (SD) change in FEV1 (% predicted) at 6 months: Supplements (N=7): -4 (16.12) vs Control (N=6): 4 (18.41)**<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br><br>Poustie 2006<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 3 months: Supplements (N=48): 1.11 (1.25) vs Control (N=51): 0.77 (0.73)<br>Mean (SD) change in weight (kg) at 6 months: | investigators who assessed the outcome measures were blinded.<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (2 participants dropped out, one in each group after completing baseline (reasons included feeling unwell and change of mind) and were not followed up; 2 out of 7 participants allocated to the supplement group were not taking supplements at 3 months, but were included in the analysis, which was judged to be ITT.<br>Other bias: Unclear risk (Unable to make clear judgement)<br><br>Poustie 2006<br>Random sequence generation (selection bias): Low risk (Generation of the randomisation sequence used random number tables)<br>Allocation concealment (selection bias): Low risk (Used sealed opaque envelopes) |

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| other outcomes. *<br>Study dates<br>Smyth 2014<br>Last search: 03 July 2014<br><br>Hanning 1993<br>Not reported *<br><br>Kalnins 2005<br>Not reported *<br><br>Poustie 2006<br>Not reported *<br>Source of funding<br>Smyth 2014<br>Not reported<br><br>Hanning 1993<br>Dietary supplements for the study were donated by Nestlé enterprises Ltd, Kraft General Foods, Canada Inc; The Quaker Oats Company, Fortino's Supermarket Ltd; and A & P Supermarkets. Motivational | months, they had been diagnosed as having cystic fibrosis or had received enteral nutrition. Children who were excluded were considered eligible later if these criteria no longer applied. * | | | Supplements (N=50): 2.05 (1.8) vs Control (N=51): 1.72 (1.18)<br>Mean (SD) change in weight (kg) at 12 months: Supplements (N=50): 3.13 (2.35) vs Control (N=52): 2.97 (1.97)<br>Mean (SD) change in weight centile (percentile) at 3 months: Supplements (N=48): 2.12 (6.58) vs Control (N=51): 0.4 (4.98)<br>Mean (SD) change in weight centile (percentile) at 6 months: Supplements (N=50): 2.75 (9.56) vs Control (N=51): 0.63 (5.6)<br>Mean (SD) change in weight centile (percentile) at 12 months: Supplements (N=50): 0.83 (10.96) vs Control (N=52): -1 (7.14)<br>Mean (SD) change in height (cm) at 3 months: Supplements (N=48): 1.65 (0.86) vs Control (N=51): 1.68 (0.8)<br>Mean (SD) change in height (cm) at 6 months: Supplements (N=50): 3.09 (1.03) vs Control (N=51): 3.56 (2.92)<br>Mean (SD) change in height (cm) at 12 months: Supplements (N=50): 5.91 | Blinding (performance bias and detection bias) (all outcomes): Low risk (Not possible to blind clinicians and participants, but the researcher undertaking the analysis of outcomes was masked as to the allocation groups)<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (Analysis was by intention to treat. All 102 randomised children completed the trial. However, unable to collect interim data on 2 children from the supplement group (owing to parental choice or illness) and 1 child from the standard care group (illness). Spirometry data available for 70 of the 72 participants aged 5 and above).<br>Other bias: Low risk (No other potential source of bias identified).<br><br>Other information |

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| prizes and coupons were donated by local outlets of A and A Records and Tapes, Burger King, Swiss Chalet,and Harvey's. *<br><br>Kalnins 2005<br>Supported by Mead Johnson, Canada. *<br><br>Poustie 2006<br>The trial was funded by a grant from the UK Cystic Fibrosis Trust, which, after initial peer review of the protocol and receipt of regular interim reports, had no further role in the design of the trial, analysis of the results, or reporting of the findings. * | | | | (0.85) vs Control (N=52): 5.85 (1.85)<br>Mean (SD) change in height centile (percentile points) at 3 months: Supplements (N=48): 0.57 (3.69) vs Control (N=51): 1.13 (3.81)<br>Mean (SD) change in height centile (percentile points) at 6 months: Supplements (N=50): 0.24 (0.27) vs Control (N=51): 1.98 (9.7)<br>Mean (SD) change in height centile (percentile points) at 12 months: Supplements (N=50): 0.53 (6.94) vs Control (N=52): 1.18 (5.62)<br>Mean (SD) change in BMI (kg/m2) at 3 months: Supplements (N=48): 0.19 (0.65) vs Control (N=51): 0.05 (0.41)<br>Mean (SD) change in BMI (kg/m2) at 6 months: Supplements (N=50): 0.39 (0.87) vs Control (N=51): 0.15 (0.67)<br>Mean (SD) change in BMI (kg/m2) at 12 months: Supplements (N=50): 0.32 (1.03) vs Control (N=52): 0.24 (0.78)<br>Mean (SD) change in BMI centile (percentile points) at | |

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| | | | | 3 months: Supplements (N=48): 2.72 (11.42) vs Control (N=51): -0.56 (8.47)<br>Mean (SD) change in BMI centile (percentile points) at 6 months: Supplements (N=50): 4.46 (15.5) vs Control (N=51): -1.29 (12.66)<br>Mean (SD) change in BMI centile (percentile points) at 12 months: Supplements (N=50): 0.67 (18.2) vs Control (N=52): -2.32 (9.63)<br>FEV1<br>Mean (SD) change in FEV1 (% predicted) at 3 months: Supplements (N=31): -2.55 (12.28) vs Control (N=38): 5.37 (12.97)<br>Mean (SD) change in FEV1 (% predicted) at 6 months: Supplements (N=32): -1.78 (11.51) vs Control (N=38): 1.61 (16.45)<br>Mean (SD) change in FEV1 (% predicted) at 12 months: Supplements (N=32): -3.41 (13.5) vs Control (N=38): -1.5 (14.89)<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects | |

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| | | | | Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br><br>* Extracted from individual paper. **Calculated by the NGA team using a correlation of 0.7 | |
| Full citation<br>Savage, E., Beirne, P. V., Ni Chroinin, M., Duff, A., Fitzgerald, T., Farrell, D., Self-management education for cystic fibrosis, Cochrane Database of Systematic Reviews, 9, CD007641, 2014<br>Ref Id<br>451702<br>Country/ies where the study was carried out<br>Watson 2008: UK<br>Study type<br>Savage 2014 | Sample size<br>Watson 2008<br>N= 74 adults were enrolled and stratified by disease severity into low or high risk disease.<br>Intervention: N= 37<br>Control: N = 37<br>48 adults completed the study through to 12-month follow-up assessment<br>23 in intervention group<br>25 in control group | Interventions<br>Intervention: Nutrition education<br>General and disease-specific nutrition education ('Eat Well with CF')<br>Content: knowledge on general and disease-specific nutrition topics (energy intake, digestion, pancreatic enzyme replacement, managing appetite, exercise, dietary fibre, reading food labels, body image); self-management skills on goal setting in small incremental steps to establish new behaviours<br>Mode of delivery: written material focusing on weekly activities, taking approximately 30 minutes each week; supplementary workshops (introductory, weeks 5 and 10) and weekly telephone calls delivered by a dietitian<br>Duration: 10 weeks. | Details<br>Watson 2008.<br>RCT, parallel design. The study was conducted with adults from the CF clinic of Papworth Hospital, Cambridge, UK.<br>For quality of life, CFQOL - Questionnaire from Gee paper, specific to CF 9 domains, 52 items, was used. Only U test statistic and P values were reported for each QoL domain. *<br>* Information extracted from primary study | Results<br>Watson 2008.<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 6 months: Intervention (N=23): 0.4 (7.63) vs control (N=25): 0.8 (8.09) **<br>Mean (SD) change in weight (kg) at 12 months: Intervention (N=23): 0.8 (7.51) vs control (N=25): 1.2 (8.28) **<br>FEV1<br>Mean (SD) change in FEV1 % predicted at 6 months: Intervention (N=23): 2.3 (19.52) vs control (N=25): 0.81 (16.75) **<br>Mean (SD) change in FEV1 % predicted at 12 months: Intervention (N=23): 0.2 | Limitations<br>Savage 2014<br>AMSTAR score: 10/11 (Declarations of interest and sources of support were reported for the systematic review but not for the included studies).<br>Watson 2008<br>Random sequence generation (selection bias): Low risk (The trial authors state that a "minimisation method of randomisation was used to ensure that the same number of patients were allocated to each group" (Watson 2008: page 848)<br>Allocation concealment (selection bias): Low risk (No details are provided |

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| Cochrane systematic review<br>Watson 2008<br>RCT, parallel design<br>Aim of the study<br>Savage 2014<br>To assess the effects of self-management education interventions on improving health outcomes for people with CF and their caregivers.<br>Watson 2008<br>To test the hypothesis that adults with CF completing "Eat Well with CF" would have an improved nutritional status, improvement in specific nutrition knowledge, and an improvement in self-efficacy regarding their ability to cope with a special diet, compared to those | Characteristics<br><br>Watson 2008<br>Individuals with CF older than 16 years of age<br>Mean (range) age: intervention group 26.4 (17.2 - 43.2) years; control group 24.2 (16.9 - 38.1) years<br>Gender: intervention group (12 males, 11 females); control group (14 males, 11 females)<br>Disease status: intervention group - mean BMI (kg/m2) = 21.3; pancreatic insufficiency (n = 21); Psuedomonas aeruginosa in sputum (n = 18); non-Psuedomonas | Setting: home (weekly written activities) and hospital (workshops)<br>Control: Standard treatment | | (19.16) vs control (N=25): -0.79 (16.98)**<br>Quality of life<br>physical functioning at 6 months: P= 0.05<br>physical functioning at 12 months: P= 0.61<br>social functioning at 6 months: P= 0.85<br>social functioning at 12 months: P= 0.54<br>treatment issues at 6 months: P= 0.74<br>treatment issues at 12 months: P= 0.68<br>chest symptoms at 6 months: P= 0.59<br>chest symptoms at 12 months: P= 0.62<br>emotional response at 6 months: P= 0.45<br>emotional response at 12 months: P= 0.07<br>concerns for the future at 6 months: P= 0.46<br>concerns for the future at 12 months: P= 0.03<br>interpersonal relationships at 6 months: P= 0.75<br>interpersonal relationships at 12 months: P= 0.64<br>body image at 6 months: P= 0.24<br>body image at 12 months: P= 0.59 | by the trial authors in the published records.Information provided by the principal author on request states that “an independent randomiser was used who was part of the R and D [Research and Development] department of the hospital”. and which was “supervised by the project statistician...independently of the investigator”<br>Blinding (performance bias and detection bias): Unclear risk (The trial authors state that “The study could not be blinded to either the subjects or the investigators because of the nature of the intervention” (Watson 2008: 848). Information provided by the principal author on request states that “no blinding” of outcome assessors took place. It is unclear if providers of care or data analysts were blinded from knowing which group participants were randomised to) |

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| receiving standard care. *<br>Study dates<br>Savage 2014<br>Date of the last search of the Cochrane Cystic Fibrosis and Genetic Disorders Groups Trials Register: 22 August 2013<br>Data of the last searches of databases through EBSCO (CINAHL; Psychological and Behavioural Sciences Collection; PsychInfo; SocINDEX) and Elsevier (Embase) and handsearch of relevant journals and conference proceedings: 01 February 2014.<br>Watson 2008<br>The duration of the study was from January 2003 to August 2005 | (n = 5); homozygous DF508 (n = 13); heterozygous DF508 (n = 7); other (n = 3); control group - mean BMI (kg/m2) = 21.1; pancreatic insufficiency (n = 22); Pseudomonas aeruginosa in sputum (n = 21); non-Psuedomonas (n = 4); homozygous DF508 (n = 16); heterozygous DF508 (n = 8); Other (n = 1)<br><br>Inclusion criteria<br>Watson 2008<br>For inclusion, participants had to be older than 16 years, able to understand written English, not partaking in other research. | | | career issues at 6 months: P= 0.15<br>career issues at 12 months: P= 0.28<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br>* Data extracted from individual paper<br>** Change calculated by the NGA team assuming a correlation of 0.7 | Incomplete outcome data (attrition bias) (all outcomes): Low risk (Of the 74 adults enrolled with equal numbers in the intervention (n = 37) and control (n = 37) groups, 48 were included in the "completer analysis" at 12 months follow-up (23 in intervention group, and 25 in control group). Incomplete outcome data are reported for each assessment point for intervention and control groups as follows: Intervention group: baseline data are reported as missing from 3 of the 37 allocated to group due to relocation (n = 1) and non-return of questionnaires (n = 2). At 6 months follow-up, data from a further 6 participants are reported as missing due to withdrawal from the study (n = 3), defaulting from follow-up (n=2) or death (n=1). At 12 months follow-up, data from a further 5 participants are reported as missing due to defaulting from follow-up (n = 4) or death (n = 1). |

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| Source of funding<br>Savage 2014<br>Internal sources: University College Cork, Ireland. External sources: Health Research Board, Ireland.<br>Watson 2008<br>The research was funded by the NHS Regional Research and Development grant. Helen Watson was supported by the Papworth Hospital Respiratory Research Fund. Additional funding was provided by Solvay Healthcare (Southampton, UK) * | Exclusion criteria<br>Watson 2008<br>Participants were excluded if they were on heart/lung transplant list or were pregnant or lactating | | | | The number of participants in the intervention group included in the "completer analysis" is reported as 23. Control group: baseline data are reported as missing from 3 of the 37 allocated to group due to relocation (n = 1) and non-return of questionnaires (n = 2). At 6 months follow-up, data from a further 2 participants are reported as missing due to relocation (n = 1) or death (n = 1). At 12 months follow-up, data from a further 7 participants are reported as missing due to defaulting from follow-up (n = 6) or death (n = 1). The number of participants in the control group included in the "completer analysis" is reported as 23. Missing outcome data are balanced in numbers across both groups with similar reasons for missing data across both groups.)<br>Selective reporting (reporting bias): Unclear risk (All outcomes mentioned in the |

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| | | | | | published record are reported. It is unclear if additional outcomes were pre-specified in the study protocol but not reported)<br>Other bias: Low risk (No other potential source of bias identified)<br><br>Other information<br>Watson 2008<br>The primary outcome measure of an increase in weight after 12 months was used to calculate the required sample size. For this, data on weight gain in patients attending the CF clinic of the study centre from 1998 to 2000 were reviewed. The trial authors stated that: “By using the ’Eat Well with CF’ programme it was anticipated that subjects mean (SD) weight would increase by 3 (3) kg after 12 months. With 80% power and two-sided significance of 5% and allowing for 15% dropout or loss to follow- |

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|---|---|---|---|---|---|
| | | | | | up, the recruitment target was 46 participants per group" (Watson 2008: page 848). Microbiological segregation was introduced during the course of the study which prohibited the use of group workshops. Consequently the study could not continue and therefore target levels of recruitment could not be achieved.<br>The trial authors define high disease risk as participants with < 30% predicted FEV1, on enteral feeding, or with diabetes. |
| Full citation<br>Goldbeck,Lutz, Fidika,Astrid, Herle,Marion, Quittner,Alexandra L., Psychological interventions for individuals with cystic fibrosis and their families, Cochrane Database of Systematic Reviews, -, 2014 | Sample size<br>Powers 2003<br>N=12<br>Behavioural and nutrition intervention: N=7<br>Nutrition intervention only: N=5<br>Stark 1996<br>N=10. 1 withdrew from control group after | Interventions<br>Powers 2003<br>Intervention 1: Behavioural management training plus nutritional intervention<br>Nutrition intervention with strategies for enhancing calorie intake - behavioral management training for parents designed to encourage children to eat food consistent with CF dietary recommendations.<br>Intervention 2: Nutritional intervention only | Details<br>Cochrane Systematic Review<br>Powers 2003<br>Parallel RCT<br>Stark 1996<br>Parallel RCT with half participants receiving intervention first then other half 3 months later - not reported. 4 families changed group after randomisation due to conflicting vacation | Results<br>Powers 2003<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 1 year (post-treatment): Nutritional intervention plus behavioural management training (n=4): 1.32 (0.64) vs nutritional intervention alone (n=4): 1.75 (0.57)<br>Mean (SD) change in height (cm) at 1 year (post-treatment): Nutritional | Limitations<br>Goldbeck 2014<br>AMSTAR score: 9/11 (Publication bias was not mentioned; declarations of interest and sources of support were provided in relation to the systematic review but not in relation to the included studies).<br>Powers 2003<br>Random sequence generation (selection |

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| Ref Id<br>320813<br>Country/ies where the study was carried out<br>Powers 2003: USA Stark 1996: USA Stark 2009: USA<br>Study type<br>Cochrane Systematic Review<br>Powers 2003<br>Parallel RCT<br>Stark 1996<br>Parallel RCT with half participants receiving intervention first then other half 3 months later - not reported. 4 families changed group after randomisation due to conflicting vacation scheduling, thus not truly randomized<br>Goldbeck 2014<br>Cochrane systematic review | randomisation. Total sample=9<br>Behavioural intervention: N=5<br>Wait list control: N=4)<br>Stark 2009<br>Population of interest N= 177 (met eligibility). Randomised N= 79. There were 6 dropouts in both arms prior to treatment, 67 participants were included in the analysis.<br>Behavioural intervention plus nutrition education: N=33<br>Nutrition education: N=34<br>Characteristics<br>Powers 2003<br>Infants and children with CF aged less than 3 years old.<br>Pancreatic insufficiency. | Both groups received 8 sessions (45 to 60 minutes) over 1 year: Sessions 1 to 4 (3 months) intensive education<br><br>Stark 1996<br>Intervention: Group behavioural intervention.<br>7 weekly sessions - baseline assessment plus snack, breakfast, relaxation skills training, lunch, dinner and maintenance strategies targeted over following 7 sessions.<br>Duration of treatment: 6 weeks.*<br>Control: Wait list control.<br>Parent meeting and 7-day food diaries at times corresponding to baseline and last week of intervention.<br><br>Stark 2009<br>Intervention 1: Behavioural intervention<br>Behavioral intervention in group setting for change around nutrition and energy (Be-In-CHARGE!; n = 33) (available online at www.oup.com/us/pediatricpsych) f or 9 weeks.<br>Intervention 2: Nutrition education<br>Nutrition education in group setting for 9 weeks.<br><br>* Information extracted from individual paper | scheduling, thus not truly randomized<br>Stark 2009<br>RCT.<br>The parent satisfaction questionnaire used a 7-point scale (higher numbers indicated greater satisfaction) | intervention plus behavioural management training (n=4): 5.1 (2.36) vs nutritional intervention alone (n=4): 7.13 (0.99)<br>Mean (SD) change in % ideal body weight at 1 year (post-treatment): Nutritional intervention plus behavioural management training (N=4): 8.49 (20.07) vs nutritional intervention alone (N=3): 9.4 (27.29) ***<br>Mean (SD) change in weight % for age at 1 year (post-treatment): Nutritional intervention plus behavioural management training (N=4): 4.2 (10.04) vs nutritional intervention alone (N=4): 4.8 (13.70)***<br>FEV1<br>Not reported*<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br><br>Stark 1996 | bias): Unclear risk (not reported)<br>Allocation concealment (selection bias): Unclear risk (not reported)<br>Blinding (performance bias and detection bias): High risk (Unclear)<br>Incomplete outcome data (attrition bias) (all outcomes): Unclear risk (The authors recorded the drop-outs (33%) and presented the reasons. However, reasons for drop-outs are not reported separately for both conditions. They additionally reported that a comparison of children who withdrew from the study and those who completed the study protocol yielded no significant differences on demographic and anthropometric data<br>Stark 1996<br>Random sequence generation (selection bias): Unclear risk (The authors did not describe details of random generation process. It is just stated that 'the nine subjects were randomly assigned to either a |

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|---|---|---|---|---|---|
| Stark 2003<br>Parallel RCT<br>Stark 2009<br>RCT<br>Aim of the study<br>Goldbeck 2014<br>To determine whether psychological interventions for people with cystic fibrosis provide significant psychosocial and physical benefits in addition to standard medical care.<br>Powers 2003<br>To examine the feasibility and potential effectiveness of a behavioural intervention targeting improvements in calorie consumption and weight gain in a sample of 12- to 36-month-old toddlers with CF and their families* | Stark 1996<br>Children with CF<br>Age range: 5.3 years to 10.1 years.<br>Mean age: 7.3 years (SD = 1.7).<br>Stark 2009<br>Children and young people with CF aged from 4 to 12 years<br>Pancreatic insufficiency; and weight for age and height ≤40th percentile.<br>Inclusion criteria<br>Powers 2003<br>Children were < 3 years old, had a confirmed diagnosis of CF with pancreatic insufficiency, were prescribed an unrestricted fat diet *<br>Stark 1996<br>Not reported.* | | | Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 6 weeks (posttreatment)*: Behavioural group treatment (n=5): 1.7 (3.83) vs wait list control (n=4): 0 (4.73) ** Cochrane reports N=3<br>Mean (SD) change in height (cm) at 6 weeks (posttreatment)*: Behavioural group treatment (n=5): 1.2 (8.06) vs wait list control (n=4): 1.3 (15.38) **<br>Mean (SD) change in weight (z score) at 6 weeks (posttreatment)*: Behavioural group treatment (n=5): 1.93 (0.62) vs wait list control (n=4): 0.05 (0.44)**<br>FEV1<br>Mean (SD) change in FEV1% at posttreatment: Behavioural group treatment (n=5): -6 (9,51) vs wait list control (n=4): 0,5 (20,32) **<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported* | behavioral intervention or a wait list control group' (Stark 1996).<br>Allocation concealment (selection bias): Unclear risk (The authors did not provide information about adequate concealment of allocation)<br>Blinding (performance bias and detection bias): High risk (Participants and personnel providing the intervention were not able to be blinded due to the nature of the intervention and the study design (wait-list-control design). However all objective measures (e.g. weight) are not likely to be influenced by the lack of blinding)<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (The authors reported that there was no attrition)<br>Selective reporting (reporting bias): Unclear risk (The authors reported all pre-specified outcomes. It is unclear if additional |

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| Stark 1996<br>To replicate a behavioural treatment protocol developed by Stark and colleagues using a wait list control group of children with CF as a comparison to the children receiving treatment.*<br>Stark 2009<br>To evaluate the efficacy of a behavioural plus nutrition education intervention, Be-In-CHARGE!, compared to nutrition education alone, on calorie intake and weight gain in children with CF and pancreatic insufficiency. *<br>* Information extracted from individual paper<br>Study dates<br>Goldbeck 2014 | Stark 2009<br>Age 4-12 years, confirmed diagnosis of CF, pancreatic insufficiency, weight for age or for height ≤ 40th percentile.<br>Participants were recruited from 5 CF centres located in the Eastern, Midwestern, and Southern USA.<br>Exclusion criteria<br>Powers 2003<br>Other disease or condition known to affect growth.<br>Stark 1996<br>Not reported*<br>Stark 2009<br>Medical condition that would affect growth or appetite (e.g. steroids), significant developmental delay or mental | | | Patient and parent or carer satisfaction<br>Not reported*<br><br>Stark 2009<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 9 weeks (post-treatment): Nutritional intervention plus behavioural management training (n=33): 1.47 (1.27) vs nutritional intervention alone (n=34): 0.92 (1.03)<br>Mean (SD) change in weight (kg) at two years follow-up: Nutritional intervention plus behavioural management training (n=28): 6.97 (3.6) vs nutritional intervention alone (n=31): 6.45 (3.67)<br>Mean (SD) change in height (cm) at two years follow-up: Nutritional intervention plus behavioural management training (n=28): 13.34 (1.93) vs nutritional intervention alone (n=31): 13.54 (2.93)<br>Mean (SD) BMIz change at 9 weeks (post-treatment): Nutritional intervention plus behavioural management training (n=33): 0.38 (0.46) | outcomes were pre-specified in the study protocol but not reported)<br>Stark 2009<br>Random sequence generation (selection bias): Low risk (Participants were 'randomised to the treatment arms by coin flip by research assistant and postdoctoral fellow together' (Stark 2009, p.916))<br>Allocation concealment (selection bias): Low risk (Assignment could not be foreseen by participants and investigators enrolling participants because of coin flipping by research assistant and postdoctoral fellow together)<br>Blinding (performance bias and detection bias): Unclear risk (The authors of the study state that 'families were never explicitly told which treatment they had been assigned' (Stark et al 2009, p.916). But, 'as with any behavioral intervention, |

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| Most recent search of the Cystic Fibrosis and Genetic Disorders Group's register: 19 December 2013<br>Most recent search of the Depression, Anxiety and Neurosis Group's register: 12 November 2013<br>Powers 2003<br>Toddlers and their parents were approached for participation in the study from July 1997 to July 1998*<br>Stark 1996<br>Not reported*<br>Stark 2009<br>Not reported *<br><br>* Information extracted from individual paper<br>Source of funding<br>Goldbeck 2014 | health diagnosis of depression or psychosis (parent or child); positive sputum culture for Burkholderia cepacia; FEV1 < 40% of predicted; or receiving enteral or parenteral nutrition. * | | | vs nutritional intervention alone (n=34): 0.18 (0.47)<br>Mean (SD) change in BMI z score at two years follow-up: Nutritional intervention plus behavioural management training (n=28): 0.13 (0.81) vs nutritional intervention alone (n=31): -0.22 (0.5)<br>Mean (SD) change height z score at two years follow-up: Nutritional intervention plus behavioural management training (n=28): 0.03 (0.3) vs nutritional intervention alone (n=31): 0.04 (0.32)<br>FEV1<br>FEV1 change at two years follow-up: Nutritional intervention plus behavioural management training (n=13): 0.16 (22) vs nutritional intervention alone (n=15): -5 (13)<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Parent satisfaction at post-treatment: Parents in both groups reported high | it is not possible to keep subjects unaware of the treatment they are receiving or therapists the treatment they are providing' (Stark 2009, p.921). No details are provided about blinding of outcome assessors.<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (Of the 79 enrolled children 40 were assigned to the nutrition education group (NE) and 39 to the behaviour plus nutrition education group. There have been 6 drop outs in both arms prior to treatment. Data of 67 children was available for analysis post-treatment (NE n = 33 and behavioural plus nutrition education intervention n = 34). 24 month follow-up data of 28 children in the behaviour plus nutrition education intervention group and of 31 children in the NE group was available for analysis. The authors provided a flow diagram of participants randomised to both study arms and |

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| Internal sources: Royal Liverpool Children's NHS Trust, UK; National Institute of Health, USA.<br>External sources: No sources of support supplied<br>Powers 2003<br>This research was supported in part by Grants R01 DK54915 and K24 DK59973 from the National Institutes of Health (NIH)/National Institute of Diabetes and Digestive and Kidney Diseases (to Scott W. Powers) and Grants 96-81 and 97-76R from the Genentech Foundation for Growth and Development (to Scott W. Powers). Additional support was provided by | | | | ratings of satisfaction with treatment (>6 in a 7 point scale) with no statistically significant difference on eight of nine dimensions (p>0.05) (which related to the parents' satisfaction with the child progress, the impact of the program on child caloric intake and mealtime behaviour, the group leader's teaching skills, and whether they would recommend the program to a friend). For "approach used to increase child's calorie intake" the behavioural plus nutrition education intervention was rated superiod (p=0.005). However, ratings of both groups were above 6. *<br>* Extracted from primary paper<br>** Calculated by the NGA technical team using data from primary paper and using a correlation of 0.7<br>*** Calculated by the NGA team using data from Cochrane and using a correlation of 0.7 | assessed at each point in time from baseline to 24-month follow up (see Stark 2009, p.916 Figure 1).<br>Selective reporting (reporting bias): Low risk (The study protocol is available and all of the study's pre-specified outcomes have been reported)<br>Other information |

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| United States Public Health Service Grant M01 RR 08084 from the National Center for Research Resources of the NIH. *<br>Stark 1996<br>The research was supported by a grant from the National Cystic Fibrosis Foundation (no. 2117) to Lori J. Stark*<br>Stark 2009<br>This study was supported by grants R01 DK50092 and D24 DK 059492 from the National Institutes of Health (L.J.S.. Additional support was provided by grant M01 RR 0808 from the National Center for Research Resources of the NIH. * | | | | | |

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| *Information extracted from individual paper | | | | | |
| Full citation<br>Chinuck, R., Dewar, J., Baldwin, D. R., Hendron, E., Appetite stimulants for people with cystic fibrosis, Cochrane Database of Systematic Reviews, 7, CD008190, 2014<br>Ref Id<br>365496<br>Country/ies where the study was carried out<br>Eubanks 2002: USA Homnick 2004: USA Marchand 2000: USA<br>Study type<br>Chinuck 2014<br>Cochrane Systematic Review<br>Eubanks 2002<br>RCT, parallel design | Sample size<br>Eubanks 2002<br>N=17 participants<br>Intervention: N=10<br>Placebo: N=7<br>Homnick 2004<br>18 patients enrolled, 16 completed study<br>Intervention: N=8<br>Placebo: N=8<br>Marchand 2000<br>12 participants<br>Characteristics<br>Eubanks 2002<br>Age: > 6 years<br>Sex: 8 females, 9 males<br>Inclusion criteria: pancreatic insufficiency<br>FEV1>40%<br>growth failure defined as no weight gain in | Interventions<br>Eubanks 2002<br>Intervention: appetite stimulant<br>Megasterol acetate 10 mg/kg/day (adjusted at subsequent visits)<br>Duration: 6 months *<br>Control<br>Placebo<br><br>Homnick 2004<br>Intervention: appetite stimulant<br>Cyproheptadine hydrochloride 4mg 4 x daily.<br>2 mg daily for 1 week, then 4mg daily for 11 weeks. (Total duration intervention: 12 weeks)*<br>Control<br>Placebo<br><br>Marchand 2000<br>Intervention: appetite stimulant<br>Megasterol acetate 10 mg/kg/day<br>Intervention implemented for 12 weeks *<br>Control<br>Placebo | Details<br>Eubanks 2002<br>Double-blinded, placebo-controlled RCT.<br>Parallel design.<br><br>Homnick 2004<br>Double-blinded, placebo-controlled RCT.<br>Parallel design.<br><br>Marchand 2000<br>Double-blinded, placebo-controlled RCT.<br><br>Cross-over design. | Results<br>Eubanks 2002<br>Indices of nutrition and growth<br>Change in weight (kg) at 3 months, mean (SD): Appetite stimulants (N=10): 4.3 (2.9) vs placebo (N=7): 1.3 (1.4)<br>Change in weight (kg) at 6 months, mean (SD): Appetite stimulants (N=10): 5.3 (3.6) vs placebo (N=7): 1.5 (1.6)<br>Change in weight z score at 3 months, mean (SD): Appetite stimulants (N=10): 0.72 (0.77) vs placebo (N=7): 0.07 (0.22)<br>Change in weight z score at 6 months, mean (SD): Appetite stimulants (N=10): 0.76 (0.73) vs placebo (N=7): 0.02 (0.2)<br>FEV1<br>Change in FEV1 % at 3 months, mean (SD): Appetite stimulants (N=10): 9.85 (13.85) vs placebo (N=7): -3.7 (17.3)<br>Change in FEV1 % at 6 months, mean (SD): Appetite stimulants (N=10): | Limitations<br>Chinuck 2014<br>AMSTAR score: 10/11 (Declarations of interest by the authors of the systematic review are provided, however the review did not mention the declarations of interest related to the included studies)<br>Eubanks 2002<br>Random sequence generation (selection bias): Low risk (Quote: "Participants allocated by computer-generated randomisation schedule")<br>Allocation concealment (selection bias): Unclear risk (Method of concealment not described)<br>Blinding (performance bias and detection bias) (Participants): Low risk (Double-blind)<br>Blinding (performance bias and detection bias) (Clinicians): Low risk (Double-blind) |

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|---|---|---|---|---|---|
| Homnick 2004<br>RCT, parallel design<br>Marchand 2000<br>RCT, cross-over design<br>Aim of the study<br>Chinuck 2014<br>To systematically search for and evaluate evidence on the beneficial effects of appetite stimulants in the management of CF-related anorexia and synthetize reports of any side-effects<br>Eubanks 2002<br>To test whether megestrol acetate would have beneficial effects on growth in patients with CF and pancreatic insufficiency *<br>Homnick 2004<br>To determine the effects of cyproheptadine hydrochloride on | the preceding 6 months<br>Homnick 2004<br>Age: adults and children<br>Sex: 10 females, 6 males<br>Marchand 2000<br>Age: mean age 7.4 years. Age range: 21 months to 10.4 years*<br>Sex: 9 females, 3 males<br>* Information extracted from individual paper<br>Inclusion criteria<br>Eubanks 2002<br>Inclusion criteria: pancreatic insufficiency; FEV1> 40%; growth failure defined as no weight gain in the preceding 6 months; percent ideal body weight of <85%*, weight <5th percentile | | | 6.47 (6.64) vs placebo (N=7): 0.83 (12.4)<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>The number of pulmonary exacerbations requiring intravenous antibiotics was similar with 6 courses of intravenous antibiotics administered to each group of patients.*<br>Adverse effects<br>Frequency of adverse effects (constipation) at 6 months: Appetite stimulants (N=10): 1 vs placebo (N=7): 0<br>Patient and parent or carer satisfaction<br>Not reported*<br>Homnick 2004<br>Indices of nutrition and growth<br>Mean (SD) change in weight z score at 3 months: intervention (N=5) 0.572 (0.457) vs control (N=7) 0.04 (0.305)<br>Mean (SD) change in weight (kg) at 3 months (12 weeks): intervention (N=8): 3.45 (9.01) vs control (N=8): 1.1 (9.68)**<br>Mean (SD) change in height (cm) at 3 months (12 | Blinding (performance bias and detection bias) (Outcome assessors): Low risk (Participants, treating physician and ancillary staff blinded)<br>Incomplete outcome data (attrition bias) (all outcomes): High risk (3 patients in the placebo group withdrew when they failed to observe a treatment effect, which is a potential source of bias)<br>Selective reporting (reporting bias): High risk (Unexpected measures used to report outcomes i.e. weight for age z-score only, instead of being additional to weight as a mean (SD).<br>Other bias: Low risk (No other evident risk of additional bias)<br><br>Homnick 2004<br>Random sequence generation (selection bias): Low risk (SAS small block randomisation)<br>Allocation concealment (selection bias): Unclear risk (Not discussed) |

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| appetite, weight, and other clinical indicators in children and adults with mild to moderate CF.*<br>Marchand 2000<br>To determine whether the administration of megestrol acetate induces weight gain in malnourished patients with CF, and to assess the composition of weight gain. *<br>Study dates<br>Chinuck 2014<br>Last search of online database: 01 April 2014. Last search of the Cystic Fibrosis Trial Register: 08 April 2014<br>Eubanks 2002<br>Not reported *. Duration: 6 months<br>Homnick 2004<br>Not reported*. Duration: 12 weeks.<br>Marchand 2000 | for age*, or weight for height <5th percentile*.<br>Homnick 2004<br>Age ≥ 5 years, ability to perform spirometry, and ideal body weight for height < 100%. *<br>Marchand 2000<br>Loss of weight or plateau in weight gain for more than 3 months; weight-for-height less than 85%, and a negative change in weght z score. *<br>Exclusion criteria<br>Eubanks 2002<br>Diabetes; pregnancy or lactation; history of deep vein thrombosis; awaiting lung transplantation; | | | weeks): intervention (N=8): 1.2 (12.88) vs control (N=8): 1.0 (11.74)**<br>Mean (SD) change in BMI (weight/height2) at 3 months (12 weeks): intervention (N=8): 1.17 (1.28) vs control (N=8): 0.29 (1.99) **<br>Mean (SD) change in BMI (percentile) at 3 months (12 weeks): intervention (N=8): 12.88 (12.93) vs control: (N=8) 1.78 (9.08) **<br>Mean (SD) change in % ideal body weight at 3 months (12 weeks): intervention (N=8): 6.29 (4.79) vs control (N=8): 1.15 (5.28)**<br>FEV1<br>Not reported*<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Not reported*<br>Adverse effects<br>Not reported*<br>Patient and parent or carer satisfaction<br>Not reported*<br>Marchand 2000<br>Indices of nutrition and growth<br>Change in weight z score at 3 months, mean (SD): | Blinding (performance bias and detection bias) (Participants): Low risk (Only the pharmacist and study coordinator remained unblinded, participants were blinded)<br>Blinding (performance bias and detection bias) (Clinicians): Low risk (Only the pharmacist investigator and study coordinator remained unblinded, clinicians were blinded)<br>Blinding (performance bias and detection bias) (Outcome assessors): Low risk (Only the pharmacist investigator and study coordinator remained unblinded, outcome assessors were blinded)<br>Incomplete outcome data (attrition bias) (all outcomes): Low risk (No outcome related drop-out)<br>Selective reporting (reporting bias): High risk (Outcome stated in the 'Methods' section (pulmonary function) was not reported. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Not reported*. Duration: 12 weeks treatment followed by 12 week washout period and then 12 weeks alternate treatment<br>Source of funding<br>Chinuck 2014<br>Internal sources: Nottingham University Hospital, City Campus, UK. External sources: Nottingham University, UK.<br>Eubanks 2002<br>Supported by the National Institutes of Health (grant Nos. P30-DK54781, P50-DK53090, GCR-MOI-RR0032, and Maternal Child Health Pediatric Pulmonary Care Center grant No. MCJ-019161), the Cystic Fibrosis | aspartate aminotransferase (AST)/alanine aminotransferase (ALT) >100 U/L or other evidence of liver dysfunction. *<br>Homnick 2004<br>Any previous intolerance to antihistamines including CH; current use of narcotic or sedative medications; use of any appetite stimulant or systemic corticosteroids within 30 days prior to study start; pregnancy; inability to perform spirometry; inability to withhold other antihistamines for 1 week prior to study start; and operation of equipment | | | intervention (N=5) 0.742 (0.783) vs control (N=6) -0.05 (0.783)<br>FEV1<br>Not reported.<br>Quality of life<br>Not reported*<br>Pulmonary exacerbations<br>Frequency of pulmonary exacerbations at 3 months: intervention (N=6): 5 vs control (N=6): 3<br>Adverse effects<br>See pulmonary exacerbations<br>Patient and parent or carer satisfaction<br>Not reported*<br>* Data extracted from individual paper<br>**Change calculated by the NGA team assuming correlation of 0.7. In relation to the Homnick paper, N for each outcome was unclear so N of people who completed the study was used. | Other bias: Low risk (Significant differences reported in FEV1 % predicted between the placebo and CH groups at baseline; mean (SD) 42.3 (17.6) in the placebo group and 68.9 (28.1) in the CH group (P = 0.0392), but allowing for an adjustment of the P value for testing multiple outcomes the difference is not significant and is not evidence for a risk of bias)<br><br>Marchand 2000<br>Random sequence generation (selection bias): Unclear risk (Quote: "... patients were randomized.", no detailed information)<br>Allocation concealment (selection bias): Unclear risk (Not discussed)<br>Blinding (performance bias and detection bias) (Participants): Low risk (Double-blind)<br>Blinding (performance bias and detection bias) (Clinicians): Low risk (Double-blind) |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Foundation, and Bristol Myers-Squibb. *<br>Homnick 2004<br>Grant sponsor: MSU/KCMS CF Center Grant; Grant sponsor: Bronson Community Research Fund. *<br>Marchand 2000<br>The study was supported by a grant from Bristol-Myer-Squibb and the General Clinical Research Center at the Medical University of South Carolina. * | that may be dangerously affected by drowsiness such as farm equipment or public transportation. *<br>Marchand 2000<br>Diabetes; documented glucose intolerance; history of thrombosis; previous transplant (liver or lung); use of corticosteroids, birth-control pills, or appetite stimulants; other ongoing causes of growth failure; and pregnancy. * | | | | Blinding (performance bias and detection bias) (Outcome assessors): Low risk (No specific information, but weight measurement unlikely to be affected by not blinding assessor)<br>Incomplete outcome data (attrition bias) (all outcomes): High risk (6 out of 12 patients dropped out. No reason given for 3 patients, 2 for developed diabetes following MA, 1 for glucose intolerance on placebo. Not clear if these drop-outs were on first or second period of cross-over trial. No data used from dropouts)<br>Selective reporting (reporting bias): High risk (Outcome stated in the 'Methods' section (pulmonary function) was not reported. Plus QoL not stated in the 'Methods' section, but reported in the 'Results'<br>Other bias: Low risk (No other evident risk of additional bias)<br>Other information |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Full citation<br>White, H., Morton, A. M., Conway, S. P., Peckham, D. G., Enteral tube feeding in adults with cystic fibrosis; patient choice and impact on long term outcomes, Journal of Cystic Fibrosis, 12, 616-22, 2013<br>Ref Id<br>366595<br>Country/ies where the study was carried out<br>UK<br>Study type<br>Cohort study<br>Aim of the study<br>To examine adherence to the guidelines for initiation of enteral tube feeding and to determine the nutritional and clinical impact of up to three year of enteral tube feeding.<br>Study dates | Sample size<br>N= 21<br>15 in the intervention group<br>6 in the control group<br>Initially, 23 people were randomized. However, two patients in the intervention group died within the study, and subsequent analysis was undertaken on those who accepted ETF and survived (N=15) and those who declined (N=6).<br>Characteristics<br>Adults with CF<br>All patients had pancreatic insufficiency and were treated with pancreatic enzyme replacement therapy | Interventions<br>Intervention: Enteral tube feeding<br>Supplemental enteral tube feeding administered over 3 years.<br>All patients consumed a polymeric 2 kcal/ml enteral tube feed, providing 20-60% of daily energy intake as an overnight enteral tube feed, allowing free dietary intake during the day.<br>Control: Usual care | Details<br>Setting. Adult CF Unit, Leeds, UK<br>Data collection. Anthropometric and respiratory parameters were noted at one year time intervals from 1 year prior to starting ETF, at baseline, and during the following 3 years. In those patients who declined ETF the same measures were recorded at the point where the standard criteria for starting ETF were met and at annual intervals for 3 years.<br>Data analysis. Weight change was calculated by comparing weight at each time point to baseline weight and then calculating the percentage weight change achieved. Data were analysed for normal distribution. Descriptive statistics were used to evaluate the demographic characteristics of all patients. Unpaired t-tests (2-tailed) were used to compare | Results<br>Indices of nutrition and growth<br>Mean (SD) change in weight (kg) at 1 year: ETF (n=15): 7.3 (3.8) vs non-ETF (n=6): -0.3 (2.64)<br>Mean (SD) change in weight (kg) at 2 years: ETF (n=15): 8.3 (6.01) vs non-ETF (n=6): -0.8 (2.57)<br>Mean (SD) change in weight (kg) at 3 years: ETF (n=15): 8.9 (6.26) vs non-ETF (n=6): -0.1 (2.59)<br>Mean (SD) change in BMI (kg/m2) at 1 year: ETF (n=15): 2.7 (1.18) vs non-ETF (n=6):-0.2 (0.46)<br>Mean (SD) change in BMI (kg/m2) at 2 years: ETF (n=15): 2.9 (1.58) vs non-ETF (n=6): -0.3 (0.44)<br>Mean (SD) change in BMI (kg/m2) at 3 years: ETF (n=15): 3.3 (1.74) vs non-ETF (n=6): 0.8 (0.43)<br>FEV1<br>Mean (SD) change in FEV1 (% predicted) at 1 year: ETF (n=15): 5.3 (14.41) vs non-ETF (n=6): -5.3 (14.24)<br>Mean (SD) change in FEV1 (% predicted) at 2 years: ETF (n=15): 4.2 | Limitations<br>The quality of this study was assessed with the Newcastle-Ottawa scale assessment tool:<br>Selection: High risk (Those who accepted ETF had lower BMI, lower FEV1% predicted and more days on intravenous antibiotic treatment at baseline, although the difference was not statistically significant)<br>Comparability: High risk (The study does not control for any factor)<br>Outcome: Low risk (Length of follow-up was adequate; 2 out of 17 died in intervention group and were excluded from the analysis; cause of death for each one of these patients was unrelated to enteral tube feeding. No deaths amongst the 6 participants in the control group).<br>Other information |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Not reported<br>Source of funding<br>Not reported | Mean (SD) age at baseline: ETF: 21.8 (3.6) vs non-ETF: 23.0 (5.7), p=0.6<br>Sex, males/females ratio at baseline: ETF: 8/17 vs non-ETF: 3/6, p=1.0<br>Mean (SD) BMI (kg/m2) at baseline: ETF: 16.8 (1.6) vs non-ETF: 18.05 (1.7), p=0.08<br>Mean (SD) FEV1 (% predicted) at baseline: ETF: 39.5 (18.9) vs non-ETF: 56.3 (21.0), p=0.08<br><br>Inclusion criteria<br>All patients attending the Adult CF Unit, Leeds UK, who fulfilled the criteria for commencement of ETF (CF Trust 2002) between | | anthropometric data and lung function between those who opted to undertake or decline ETF. Pearson's Chi2 test was used to compare proportions betwee the two groups. Any participant not surviving to 3 years was then excluded from the analysis and analysed separately. In participants surviving to 3 years, longitudinal effects of enteral tube feeding upon weight gain, BMI, pulmonary function were evaluated using ANOVA (repeat measures) to explore the differences over time between the two groups over the 3 year time period and paired t-tests (1 tailed) for comparison between successive years. Data were analysed using SPSS version 19.0 (Chicago, Illinois). | (14.65) vs non-ETF (n=6): -8 (15.96)<br>Mean (SD) change in FEV1 (% predicted) at 3 years: ETF (n=15): 1.2 (13.95) vs non-ETF (n=6): -11 (15.16)<br>Quality of life<br>Not reported<br>Pulmonary exacerbations<br>Mean (SD) change in days on IV treatment at 1 year: ETF (n=15): 20.7 (31.96) vs non-ETF (n=6):2.8 (21.92)<br>Mean (SD) change in days on IV treatment at 2 years: ETF (n=15): 28 (54.64) vs non-ETF (n=6): -8 (17.36)<br>Mean (SD) change in days on IV treatment at 3 years: ETF (n=15): 43.2 (73.45) vs non-ETF (n=6): 7 (25.72)<br>Adverse effects<br>Not reported<br>Patient and parent or carer satisfaction<br>Not reported | |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| | January 2004 and May 2008. The criteria were BMI<19 kg/m2 and/or 5% acute weight loss over a 2 month period with a failure or oral nutritional supplements to adequately improve nutritional status.<br><br>Exclusion criteria<br>Presence of pancreatic sufficiency, pregnancy or lung transplantation during the 3 year follow-up period. | | | | |
| Full citation<br>Bradley, G. M., Carson, K. A., Leonard, A. R., Mogayzel, P. J., Jr., Oliva-Hemker, M., Nutritional outcomes | Sample size<br>N=40<br>Patients with gastrostomy: N=20<br>Patients without gastrostomy | Interventions<br>Intervention: Gastrostomy for enteral tube feeding<br>Control: No gastrostomy | Details<br>Setting. Cystic fibrosis Center in Baltimore, Maryland, US<br>Data collection. This is a retrospective study, CF Foundation Patient Registry | Results<br>Indices of nutrition and growth<br>Mean (SD) change in height z-score at 6 months: Cases (N=20): 0.5 (0.41) vs controls (N=20): 0.3 (0.80)* | Limitations<br>The quality of this study was assessed with the Newcastle-Ottawa scale assessment tool:<br>Selection: Low risk of bias. The non-exposed group were also patients |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| following gastrostomy in children with cystic fibrosis, Pediatric Pulmonology, 47, 743-8, 2012<br>Ref Id<br>366345<br>Country/ies where the study was carried out<br>US<br>Study type<br>Retrospective cohort study<br>Aim of the study<br>To evaluate if children with cystic fibrosis who have a BMI <50th percentile and receive supplemental feeds via a gastrostomy are more likely to achieve BMI ≥50th percentile than matched children who are managed according to standardised nutrition protocol but do not | (control arm): N=20<br>Characteristics<br>Males, n/N: patients with gastrostomy: 8/20 vs patients without gastrostomy: 8/20<br>Caucasian ethnicity, n/N: patients with gastrostomy: 17/20 vs patients without gastrostomy: 19/20<br>Median age (range) in years at CF diagnosis: patients with gastrostomy (n=20): 0.74 (0-6.58) vs patients without gastrostomy (n=20): 1.74 (0-9.41)<br>One mutation F508del, n/N: patients with gastrostomy: 12/20 vs patients without gastrostomy: 11/20 | | database and hospital medical records were used for data collection. Nutritional (weight, height, BMI) and lung function (percent predicted FEV1) data were obtained at the index visit, at 6-month follow up (±3 months) and at 1 year follow up (±3 months). Height, weight and BMI z-scores were calculated using CDC reference equations. For the controls, in addition to the standard nutritional evaluation and counseling, it was specified if they received oral nutritional supplementation, an appetite stimulant or gastroenterology referral for gastrostomy placement at any time during a 1-year follow-up period. For the cases, following data on gastrostomy was collected: technique used for gastrostomy placement, length of stay at hospital | Mean (SD) change height z-score at 1 year: Cases (N=20): 0.1 (0.40) vs controls (N=20): 0 (0.80)*<br>Mean (SD) change in weight z-score at 6 months: Cases (N=20): 0.67 (0.56) vs controls (N=20): 0.05 (0.58)*<br>Mean (SD) change in weight z-score at 1 year: Cases (N=20): 0.64 (0.52) vs controls 0.2 (0.56)*<br>Mean (SD) change in BMI z-score at 6 months: Cases (N=20): 0.9 (0.6) vs controls (N=20): 0.08 (0.48)*<br>Mean (SD) change in BMI z-score at 1 year: Cases (N=20): 0.78 (0.55) vs controls (N=20): 0.39 (0.39)*<br>FEV1 percent predicted<br>Mean (SD) change in FEV1 percent predicted at 6 months: Cases (N=14): -1.3 (16.24) vs controls (N=13): 3.2 (14.72)*<br>Mean (SD) change in FEV1 percent predicted at 1 year: Cases (N=14): -1.6 (15.94) vs controls (N=13): 6.6 (16.62)*<br>Quality of life<br>Not reported | in the same CF centre and both groups received the same nutrition protocol and in addition, the exposed group received a gastrostomy. The characteristics of the exposed group and the control group were largely similar, although their baseline height and weight z-scores were somewhat different, although neither difference reached statistical significance.<br>Comparability: High risk of bias. The study does not control for any factor.<br>Outcome: Low risk of bias. Not described who and how outcome measurements were done and if blinding was used. Blinding was likely not used since this is a retrospective study (i.e. not a study at the time of the measurements) using medical records and registry data. However, the outcomes of interest are weight, height, BMI and FEV, therefore, the measurements can be |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| receive gastrostomy.<br>Study dates<br>January 2005 to April 2010<br>Source of funding<br>NIH grant 5 T32 HD 44355-8; National Center for Research Resources grant UL1 RR 025005 | Two mutations F508del, n/N: patients with gastrostomy: 4/20 vs patients without gastrostomy: 6/20<br>Pancreatic insufficiency, n/N: patients with gastrostomy: 20/20 vs patients without gastrostomy: 20/20<br>History of airway infection with P. aeruginosa, n/N: patients with gastrostomy: 18/20 vs patients without gastrostomy: 13/20<br>History of airway infection with Burkholderia cepacia, n/N: patients with gastrostomy: 2/20 vs patients without | | following the procedure with reasons for prolonged stay if appropriate, type of supplemental formula given via gastrostomy, primary schedule for administration, and complications encountered at the time of the procedure and during the first year of follow up.<br>Data analysis. Cases were compared to controls using McNemar's test for categorical measures and paired t-test or Wilcoxon signed rank test for continuous measures. The proportion of cases and controls reaching the outcome BMI ≥50th percentile at the 6-month and 1-year follow ups was compared using Fisher's exact test abnd exact logistic regression analysis was used to estimate the odds ratio and confidence interval. Analysis was | Pulmonary exacerbations<br>Not reported<br>Adverse effects<br>Not reported<br>Patient and parent or carer satisfaction<br>Not reported<br>*Calculated by the NGA technical team | considered reliable. The follow up was done at 6 months and 1 year. Even longer follow up would useful as well in order to know the long term effect of gastrostomy, as the authors themselves note as well. As this is a retrospective study using medical records and registry data, there were no losses to follow up. However, data on FEV1 at baseline was only available for 14 exposed cases and 13 un-exposed controls (out of 20 patients in each group).<br><br>Other information |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| | gastrostomy: 0/20<br>History of airway infection with Methicillin-resistant Staph. aureus, n/N: patients with gastrostomy: 4/20 vs patients without gastrostomy: 7/20<br>CF-related diabetes, n/N: patients with gastrostomy: 2/20 vs patients without gastrostomy: 2/20<br>CF-related liver disease, n/N: patients with gastrostomy: 3/20 vs patients without gastrostomy: 1/20<br>Mean (SD) age in years at index visit: patients with gastrostomy (n=20): 9.0 (4.4) vs patients without gastrostomy | | performed using SAS version 9.22. A | | |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| | (n=20): 9.1 (4.7)<br>Mean (SD) height z score at index visit: patients with gastrostomy (n=20): -0.94 (0.50) vs patients without gastrostomy (n=20): -0.51 (1.06)<br>Mean (SD) weight z score at index visit: patients with gastrostomy (n=20): -1.40 (0.55) vs patients without gastrostomy (n=20): -1.06 (0.74)<br>Mean (SD) BMI z-score at index visit: patients with gastrostomy (n=20): -1.19 (0.60) vs patients without gastrostomy (n=20): -1.10 (0.50)<br>Mean (SD) FEV1 % predicted in | | | | |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| | years at index visit: patients with gastrostomy (n=20): 76.0(19.5) vs patients without gastrostomy (n=20): 75.7 (19.0)<br>Inclusion criteria<br>Patients with cyctic fibrosis who<br>-were 2-20 years of age<br>-received health care at a cystic fibrosis center in Baltimore, US<br>-had gastrostomy placed between January 2005 and April 2010<br>-had at least one year of post-gastrostomy data<br><br>Control group consisted of pair-matched children or | | | | |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| | young people who were also followed at the same CF Center but who did not have a gastrostomy. The "cases" and "controls" were matched at the time the case received a gastrostomy based on the following criteria: age ±2.5 years, sex, pancreatc status, BMI percentile ±10% and, if available, percent predicted FEV1 ±20%.<br>Exclusion criteria<br>Patients who had gastrostomy placed for reasons other than nutritional supplementatio n. | | | | |
| Full citation | Sample size | Interventions<br>See Cochrane SR Goldbeck 2014 | Details | Results | Limitations |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| Stark, L. J., Quittner, A. L., Powers, S. W., Opipari-Arrigan, L., Bean, J. A., Duggan, C., Stallings, V. A., Randomized clinical trial of behavioral intervention and nutrition education to improve caloric intake and weight in children with cystic fibrosis, Archives of Pediatrics & Adolescent Medicine, 163, 915-21, 2009<br>Ref Id<br>366969<br>Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | See Cochrane SR Goldbeck 2014<br>Characteristics<br>See Cochrane SR Goldbeck 2014<br>Inclusion criteria<br>See Cochrane SR Goldbeck 2014<br>Exclusion criteria<br>See Cochrane SR Goldbeck 2014 | | See Cochrane SR Goldbeck 2014 | See Cochrane SR Goldbeck 2014 | See Cochrane SR Goldbeck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| Full citation<br>Watson, H., Bilton, D., Truby, H., A randomized controlled trial of a new behavioral home-based nutrition education program, "Eat Well with CF," in adults with cystic fibrosis, Journal of the American Dietetic Association, 108, 847-52, 2008<br>Ref Id<br>346635<br>Country/ies where the study was carried out<br>UK<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | Sample size<br>See Cochrane SR Savage 2014<br>Characteristics<br>See Cochrane SR Savage 2014<br>Inclusion criteria<br>See Cochrane SR Savage 2014<br>Exclusion criteria<br>See Cochrane SR Savage 2014 | Interventions<br>See Cochrane SR Savage 2014 | Details<br>See Cochrane SR Savage 2014 | Results<br>See Cochrane SR Savage 2014 | Limitations<br>See Cochrane SR Savage 2014<br>Other information<br>None. |
| Full citation<br>Poustie, V. J., Russell, J. E., Watling, R. M., Ashby, D., | Sample size<br>See Cochrane SR Smyth 2014<br>Characteristics | Interventions<br>See Cochrane SR Smyth 2014 | Details<br>See Cochrane SR Smyth 2014 | Results<br>See Cochrane SR Smyth 2014 | Limitations<br>See Cochrane SR Smyth 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| Smyth, R. L., Calico Trial Collaborative Group, Oral protein energy supplements for children with cystic fibrosis: CALICO multicentre randomised controlled trial, BMJ, 332, 632-6, 2006<br>Ref Id<br>366523<br>Country/ies where the study was carried out<br>UK<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | See Cochrane SR Smyth 2014<br>Inclusion criteria<br>See Cochrane SR Smyth 2014<br>Exclusion criteria<br>See Cochrane SR Smyth 2014 | | | | |
| Full citation<br>Kalnins, D., Corey, M., Ellis, L., Pencharz, P. B., Tullis, E., Durie, P. R., Failure of conventional strategies to | Sample size<br>See Cochrane SR Smyth 2014<br>Characteristics<br>See Cochrane SR Smyth 2014<br>Inclusion criteria | Interventions<br>See Cochrane SR Smyth 2014 | Details<br>See Cochrane SR Smyth 2014 | Results<br>See Cochrane SR Smyth 2014 | Limitations<br>See Cochrane SR Smyth 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| improve nutritional status in malnourished adolescents and adults with cystic fibrosis, Journal of Pediatrics, 147, 399-401, 2005<br>Ref Id<br>366437<br>Country/ies where the study was carried out<br>Canada<br>Study type<br>Quasi-randomised controlled trial<br>Aim of the study<br>Study dates<br>Source of funding | See Cochrane SR Smyth 2014<br>Exclusion criteria<br>See Cochrane SR Smyth 2014 | | | | |
| Full citation<br>Homnick, D. N., Homnick, B. D., Reeves, A. J., Marks, J. H., Pimentel, R. S., Bonnema, S. K., Cyproheptadine is an effective appetite stimulant in cystic fibrosis, | Sample size<br>See Cochrane SR Chinuck 2014<br>Characteristics<br>See Cochrane SR Chinuck 2014<br>Inclusion criteria | Interventions<br>See Cochrane SR Chinuck 2014 | Details<br>See Cochrane SR Chinuck 2014 | Results<br>See Cochrane SR Chinuck 2014 | Limitations<br>See Cochrane SR Chinuck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| Pediatric Pulmonology, 38, 129-34, 2004<br>Ref Id<br>331091<br>Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | See Cochrane SR Chinuck 2014<br>Exclusion criteria<br>See Cochrane SR Chinuck 2014 | | | | |
| Full citation<br>Powers, S. W., Byars, K. C., Mitchell, M. J., Patton, S. R., Schindler, T., Zeller, M. H., A randomized pilot study of behavioural treatment to increase calorie intake in toddlers with cystic fibrosis, Children's Health Care, 32, 297-311, 2003<br>Ref Id<br>451892 | Sample size<br>See Cochrane SR Goldbeck 2014<br>Characteristics<br>See Cochrane SR Goldbeck 2014<br>Inclusion criteria<br>See Cochrane SR Goldbeck 2014<br>Exclusion criteria<br>See Cochrane SR Goldbeck 2014 | Interventions<br>See Cochrane SR Goldbeck 2014 | Details<br>See Cochrane SR Goldbeck 2014 | Results<br>See Cochrane SR Goldbeck 2014 | Limitations<br>See Cochrane SR Goldbeck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | | | | | |
| Full citation<br>Eubanks, V., Koppersmith, N., Wooldridge, N., Clancy, J. P., Lyrene, R., Arani, R. B., Lee, J., Moldawer, L., Atchison, J., Sorscher, E. J., Makris, C. M., Effects of megestrol acetate on weight gain, body composition, and pulmonary function in patients with cystic fibrosis, Journal of Pediatrics, 140, 439-44, 2002<br>Ref Id | Sample size<br>See Cochrane SR Chinuck 2014<br>Characteristics<br>See Cochrane SR Chinuck 2014<br>Inclusion criteria<br>See Cochrane SR Chinuck 2014<br>Exclusion criteria<br>See Cochrane SR Chinuck 2014 | Interventions<br>See Cochrane SR Chinuck 2014 | Details<br>See Cochrane SR Chinuck 2014 | Results<br>See Cochrane SR Chinuck 2014 | Limitations<br>See Cochrane SR Chinuck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| 329665<br>Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | | | | | |
| Full citation<br>Marchand, V., Baker, S. S., Stark, T. J., Baker, R. D., Randomized, double-blind, placebo-controlled pilot trial of megestrol acetate in malnourished children with cystic fibrosis, Journal of Pediatric Gastroenterology & Nutrition, 31, 264-9, 2000<br>Ref Id<br>365658<br>Country/ies where the study was carried out | Sample size<br>See Cochrane SR Chinuck 2014<br>Characteristics<br>See Cochrane SR Chinuck 2014<br>Inclusion criteria<br>See Cochrane SR Chinuck 2014<br>Exclusion criteria<br>See Cochrane SR Chinuck 2014 | Interventions<br>See Cochrane SR Chinuck 2014 | Details<br>See Cochrane SR Chinuck 2014 | Results<br>See Cochrane SR Chinuck 2014 | Limitations<br>See Cochrane SR Chinuck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
|---|---|---|---|---|---|
| USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | | | | | |
| Full citation<br>Hanning, R. M., Blimkie, C. J., Bar-Or, O., Lands, L. C., Moss, L. A., Wilson, W. M., Relationships among nutritional status and skeletal and respiratory muscle function in cystic fibrosis: does early dietary supplementation make a difference?, American Journal of Clinical Nutrition, 57, 580-7, 1993<br>Ref Id<br>366418<br>Country/ies where the study was carried out | Sample size<br>See Cochrane SR Smyth 2014<br>Characteristics<br>See Cochrane SR Smyth 2014<br>Inclusion criteria<br>See Cochrane SR Smyth 2014<br>Exclusion criteria<br>See Cochrane SR Smyth 2014 | Interventions<br>See Cochrane SR Smyth 2014 | Details<br>See Cochrane SR Smyth 2014 | Results<br>See Cochrane SR Smyth 2014 | Limitations<br>See Cochrane SR Smyth 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Canada<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | | | | | |
| Full citation<br>Stark, L. J., Mulvihill, M. M., Powers, S. W., Jelalian, E., Keating, K., Creveling, S., Byrnes-Collins, B., Harwood, I., Passero, M. A., Light, M., Miller, D. L., Hovell, M. F., Behavioral intervention to improve calorie intake of children with cystic fibrosis: treatment versus wait list control, Journal of Pediatric Gastroenterology & Nutrition, 22, 240-53, 1996<br>Ref Id<br>363074 | Sample size<br>See Cochrane SR Goldbeck 2014<br>Characteristics<br>See Cochrane SR Goldbeck 2014<br>Inclusion criteria<br>See Cochrane SR Goldbeck 2014<br>Exclusion criteria<br>See Cochrane SR Goldbeck 2014 | Interventions<br>See Cochrane SR Goldbeck 2014 | Details<br>See Cochrane SR Goldbeck 2014 | Results<br>See Cochrane SR Goldbeck 2014 | Limitations<br>See Cochrane SR Goldbeck 2014<br>Other information<br>None. |

| Study details | Participants | Interventions | Methods | Outcomes and Results | Comments |
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| Country/ies where the study was carried out<br>USA<br>Study type<br>RCT<br>Aim of the study<br>Study dates<br>Source of funding | | | | | |