agement of childhood illness (IMCI) guidelines); or have a diagnosed or visible sign of developmental delay. Children defined as MAM based on MUAC (>11.4 cm and <12.5cm) but SAM based on weight-for-height z-score (<-3) will be treated for SAM and are not included in this study.

Interventions: Clinics will be randomly assigned to provide children diagnosed as MAM with either the control treatment or intervention treatment. Control treatment is MSG counselling, delivered by a respected mother in the local community. MSGs are an established programme in Sierra Leone and the current national recommended treatment for MAM children. MSGs increased recovery from MAM and SAM by 5% in Sierra Leone in previous work by this team (unpublished). The intervention treatment also incorporates mother support counselling, and for those children with high-risk characteristics (mother not caretaker, not breastfeeding and/or WAZ≤-3.5), it will include provision of one packet (525 calories) of RUTF daily and a course of amoxicillin. This provision will continue until the child has reached a MUAC > 12.4 cm or 12 weeks have elapsed. All children will be assessed for study outcomes at 6, 12 and 24 weeks after

enrolment. Further details of the control and intervention protocol are in Table 2.

Sample size: Total sample size will be 880 children enrolled from 22 clinics (clusters). A total of 20 clusters, containing 40 children each, is adequate for detecting, at 80% power and 5% significance level, an increase in recovery rates in the high-risk group from 53% in the controls to 73% in the intervention group. This estimation was based on recovery rates for MAM children in Ethiopia who received no support (James *et al*, 2016) and MAM recovery rates from programmatic data in Sierra Leone when MAM children are supported with supplementary feeding. An intra-cluster correlation coefficient (ICC) of 0.05 was assumed; a conservative estimate based on the results of a cluster randomised study testing an integrated SAM protocol in Sierra Leone (Maust, 2015). We have included two extra clusters (clinics) in case of any issues with specific sites.

Additional considerations: Adherence to nutrition counselling interventions has been an issue highlighted by previous studies and has to be considered if scaling up counselling interventions for MAM in the future (Nikièma *et al*, 2014). We

have experienced challenges in implementing a protocol which provides food intervention only to some participants; however, we strive to ensure that the nutrition education implemented via MSGs is of high quality. In addition, the regular monitoring of MAM children not receiving a food intervention should allow us to "catch" any deterioration to SAM within a few days.

Conclusion: If the intervention protocol, which expands SAM admission criteria to include "high-risk MAM" children as well, is found to be superior to the current recommended nutrition education, this could become a clear and standardised protocol for better supporting MAM children in non-emergency settings. The additional focus on outcomes beyond anthropometric recovery, such as body composition and cognitive function, will provide evidence on whether the intervention supports children towards healthy adulthood, rather than purely weight or height gain.

Study timeline: Study recruitment began in November 2018 and will continue until late 2019. Follow-up will end in early 2020 and study results are planned for mid-2020.

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Longitudinal patterns of wasting and stunting – new analysis by the Knowledge Integration (KI) initiative   Upcoming research

The Bill and Melinda Gates Foundation's Knowledge Integration (KI) initiative has aggregated data from more than 190 studies on child growth and development. A team of scientists at University of California, Berkeley, in conjunction with the KI initiative, has completed an analysis of longitudinal patterns in wasting and stunting in the first two years of children's lives using KI-collected cohorts and trials. A series of manu-

scripts detailing the pooled analysis of wasting and stunting from cohort and trial data is forthcoming later in 2019, including an analysis of wasting incidence, recovery, and seasonality using data from 19 monthly-measured cohorts and an analysis of the causes and consequences of wasting using data from 38 cohorts and trials. Using data from repeatedly-measured children from a geographically diverse set of cohorts, they compare and contrast regional and age-

specific patterns in child wasting onset, spontaneous recovery, and associations between wasting incidence and a large set of child, parental, and household characteristics. They also estimate associations between different types and timings of growth faltering and later child mortality and measures of serious growth faltering.

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