

Dear paediatrician colleagues!

First, we would like to thank you for your enthusiastic work on the early recognition of children with elevated cholesterol levels, especially those who have familial hypercholesterolemia. Each year, we discover a few dozen children with genetically confirmed familial hypercholesterolemia within this programme; for each of them, we diagnose one of the parents and often their relatives as well.

Along with instructions for the execution of this programme, we would like to clearly emphasise the importance of our common efforts. People with familial hypercholesterolemia, which this universal screening programme aims to discover, face a high risk of the early development of cardiovascular diseases – even up to 100 times higher – which often affect people in the most active years of life without any prior warnings. According to the latest findings, almost one in 200 people are affected by familial hypercholesterolemia, thus making it by far the most common genetic metabolism disease, which unfortunately remains very much underdiagnosed in the developed world. Accordingly, 1,000 to 2,000 children and young people in Slovenia are affected by familial hypercholesterolemia. Despite recommendations by the most noted

international expert forums for screening during childhood, Slovenian paediatricians are still the only ones to successfully screen for hypercholesterolemia, for which we have recently been receiving a lot of positive international attention. In 2017, we established the National Register of Familial Hypercholesterolemia and Rare Dyslipidemias.

The main reasons for screening for familial hypercholesterolemia during childhood include: detection of the disease before clinical signs occur, which can be effectively prevented by taking preventive measures, especially education about a healthy lifestyle and the timely introduction of therapy; on the basis of the cholesterol level, familial hypercholesterolemia can be most effectively distinguished from multifactorial hypercholesterolemia in pre-pubertal children; an effective programme of systematic health checks during childhood covering the entire population of children of the same age groups; the cascade screening of each child with confirmed familial hypercholesterolemia enables the discovery of the disease among their parents, siblings and/or other relatives.

In the hope that we will continue to carry out quality and unified work in this area, we have prepared a practical guideline

(algorithm) for hypercholesterolemia screening within the systematic health check of five-year-old children or children who are about to enter school, as well as further management for children with confirmed hypercholesterolemia. Because a consultation on the recommended diet is often necessary, we have prepared useful diet instructions with examples of specific menus you can share with your patients' families.

We would also like to draw your attention to the **often** frequently overlooked population of people with cholesterol levels that are too low, including – among individuals with a beneficial cardiovascular risk profile – patients with serious genetic metabolism and syndrome states; this part is added to the screening algorithm (in the light of the fact that a test result will be available to you).

We look forward to good and expert future cooperation. If you have any practical dilemmas regarding the implementation of this screening programme, please do not hesitate to contact us.

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The universal cholesterol screening programme has been taking place since 1995 as an obligatory part of the systematic health check for five-year-old children or children who are about to enter school. Since 2011, the UMC – University Children's Hospital Ljubljana has been carrying out routine genetic diagnostics for the screening of familial hypercholesterolemia.

This leaflet has been prepared at the Department of Endocrinology, Diabetes and Metabolism, Unit of Special Laboratory Diagnostics and Dietetics and Nutrition Unit at the UMC – University Children's Hospital Ljubljana:

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This leaflet was expertly examined by the members of the working group for the preventive programmes for school children.

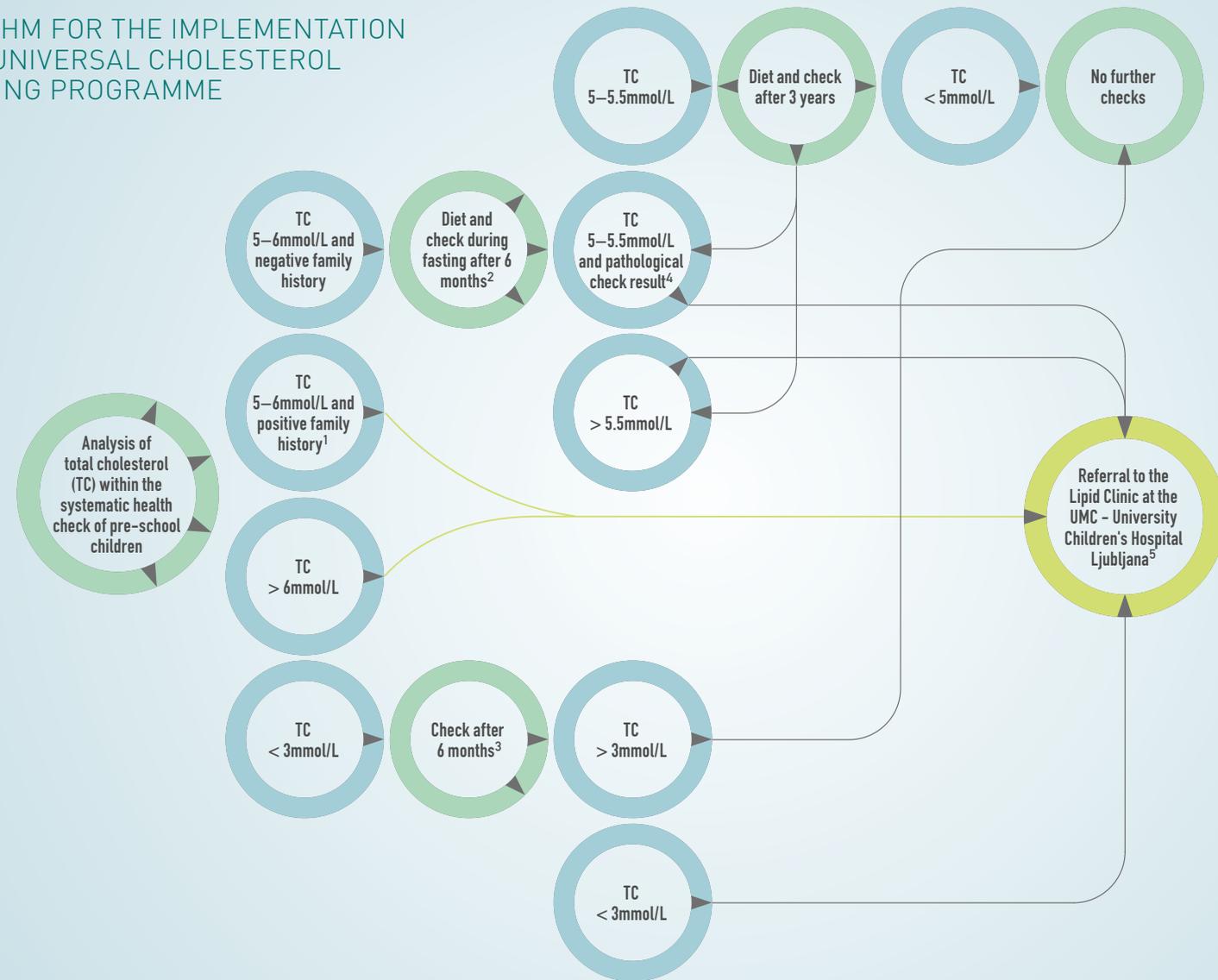
Development of the screening programme also takes place within the Slovenian Research Agency programme and projects (P3-0343, J3-4116 and J3-6798).

Additional information and consultation on the screening programme:
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NATIONAL PROGRAMME OF UNIVERSAL CHOLESTEROL SCREENING IN CHILDREN

Algorithm for the implementation of the universal cholesterol screening programme in pre-school children and dietary guidelines

ALGORITHM FOR THE IMPLEMENTATION OF THE UNIVERSAL CHOLESTEROL SCREENING PROGRAMME



1 Positive family history: an example of a more expressed hypercholesterolemia among siblings, parents and grandparents or an example of a cardiovascular disease among parents or grandparents under 60 years. If familial hypercholesterolemia is confirmed among siblings, parents or grandparents, we advise referring the patient to our clinic.

2 Control check: TC, LDL-C, HDL-C, triglycerides, AST, ALT.

3 The child has no acute infection. Control check: TC.

4 Additional pathological laboratory findings (HDL-C, triglycerides, AST, ALT) or the presence of another express risk factor (e.g. obesity, arterial hypertension, (pre-)diabetes).

5 Upon referral, please provide copies of the laboratory tests that have been carried out or write down the measurement results and dates.

DIET IN CASE OF AN INCREASED CHOLESTEROL LEVEL

General instructions

The diet in case of an increased cholesterol level and an ideal to normal weight is based on the following energy- and nutritionally-balanced nutrition and food consumption regime:

- › The energy intake is in balance with the energy used.
- › 4 to 5 regular meals a day.
- › The total cholesterol in the food is below 200mg/day.
- › The value of all the fat forms 25-30% of the daily energy intake.
- › The value of saturated fat forms up to 7% of the daily energy intake
- › The value of proteins forms 15% of the daily energy intake.
- › The value of carbohydrates forms 55% of the daily energy intake.
- › Dietary fibre amounting to 17-30g/day, 7-13g of which are soluble.
- › Plant sterols amounting to 2-3g/day.
- › Include wholefoods, fruit, vegetables and legumes.
- › Oily sea fish 3 to 4 times a week.
- › A diet with less fat and moderate use of all high-fat food.
- › Limit the intake of saturated fats and prefer 1 or more times unsaturated fat.
- › Limit the intake of refined food and food rich in sugar.

Recommended food

Food rich in soluble dietary fibre:

soy, beans, oats, dried apricots and plums, millet porridge, rye, onion, seeds and nuts, fruit and vegetables, wholefoods.

Food rich in omega3 fatty acids:

oily fish (salmon, herring, sardines, anchovy, mackerel, tuna, sprat, bonito), rapeseed, linseed oil, walnut oil, soya oil.

Food rich in plant sterols:

plant oils, seeds and nuts, margarine with added sterols.

Food rich in soy proteins:

soy, tofu, soya drink.

Non-recommended food

Food rich in saturated fat:

coconut oil, palm oil, butter, beef tallow, lard, fatty meat, chicken fat, egg yolk, cream, cheeses, solid margarine, milk chocolate.

Food rich in trans-fatty acids:

fatty beef meat, butter, milk fat, solid margarine, cakes, pastry, cookies, crackers, fried pastry.

Food rich in cholesterol:

offal, egg yolk, butter, cream, chicken skin, molluscs and shellfish, liver pâté, blood pudding, solid margarine, fatty pastry.