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**Author:** Bezem, J.
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Preventive Child Health care in the Netherlands

Preventive child health care (PCH) services monitor the growth and development of children in order to detect physical and mental health problems in the early stages [1,2]. There is adequate evidence that screening for amblyopia and the monitoring of psychosocial problems and growth in children improve health and social well-being [3-7]. The PCH system in the Netherlands is unique in that it has provided an important, highly accessible, well-known preventive service for over a hundred years, principally using a routine assessment programme open to all children between birth and 18 years old [8-10]. It is also the only primary care system in the country that adopts a broad socio-medical approach to longitudinal monitoring of health and development and it outperforms other Dutch care systems in that it sees more than 90% of all the children in the country [11,12] with an associated budget which is small by comparison with that for curative care [13]. Nevertheless, the system cannot afford to rest on its laurels. Despite the strengths of the Dutch PCH – the wide reach and its prominent position in primary care for the prevention of problems in children – challenges must be addressed in order to improve the social relevance of the system, which will have to adapt to economic, social and health care developments. There has, for example, been an increasing policy focus on prevention and early intervention, in particular in response to economic factors such as the need to reduce demand for more expensive specialised care. In addition, attendance at PCH assessments is no longer unquestioned by all parents and children and a frequent criticism is that PCH is not tailored to the care needs of parents and their children. Furthermore, greater flexibility is required in the delivery of the PCH programme so that it addresses apparent inequities in child health and the different care needs of children that arise as a result.

In response to the challenge of changing the routines in PCH and in line with the need for more attention for children at risk, the Gelderland Midden Regional Health Service developed a novel approach to organising preventive routine assessments for children of school age: the introduction of triage and task-shifting between PCH professionals [14]. Several PCH services have followed this example in the past period and others have made other changes to how routine assessments are organised. However, research was needed to validate the assumptions underlying the development of the triage approach. In this thesis we present a series of papers looking at the first results of our study of
the triage approach. Given our scientific data, our preliminary expectation is that triage and task-shifting could improve the delivery of PCH assessments for children with specific needs. However, no firm conclusions can be drawn yet because of a number of limitations affecting our study. Assuming that our initial results can be substantiated in further research, the triage approach can be expected to produce the results described below.

**Main findings of our research**

This thesis shows a with usual care comparable access to preventive basic care in the triage approach that we developed and investigated. Also the detection rate of the three health problems studied (overweight, and visual and psychosocial problems) were comparable, however the severity of the weight and psychosocial problems detected differed [15]. The efficient deployment of PCH professionals using triage and task-shifting reduced the costs of routine assessments in the age group 5 to 6 years. There are minimal cost savings in the group of children aged 10 to 11 years [16]. The associated release of manpower and funding can create more opportunities for the delivery of care to children and their families with specific health care needs. In our study PCH physicians and nurses provide more demand-driven care at the request of parents and others such as schools, and therefore this will add to an early detection of health problems. Access to the system and the efficacy of the PCH system are important: assessments must have a wide reach and include the most vulnerable children and their families, even when there is no manifest demand for care. The socio-economic status of children receiving PCH assessments on request was lower and these children were referred more often to extra care than children receiving the routine PCH assessments in both approaches [17]. School professionals using the triage approach said that they had more contact with PCH professionals and they were more positive about the appropriateness of support from PCH than school professionals who were offered the usual approach [18]. The structural presence of PCH physicians and nurses in schools, which is part of the triage approach and necessary to assess children on demand, improved access to PCH and furthered collaboration with school professionals.

We used a prospective cohort design in which we compared a group of children who received the triage approach with a group of children who were seen with
the usual approach. The comparison study group has been matched on gender and age range and we controlled for differences in socio-economic status. We used a pragmatic study design that made research in the daily practice of PCH possible. In the ideal study design children we may have carried out a randomised study in which children are offered either the triage approach or the usual approach. In practice, this was not possible because triage was already being implemented in PCH services. Alternatively, a study-design in which both a pre-assessment and the usual routine assessment are compared in one child would be time-consuming and prohibitively costly because extra trained staff is needed to independently carry out the assessments. Also this design would have been too burdensome for children and parents.

This study has some limitations. It lacks information about the test characteristics for triage. This study design did not allow us to follow children over time in the way that would have been required to learn more about the long-term health outcomes of both approaches. It would be useful to know more about the children with health problems that were not detected by the two approaches. We are in particular interested in the false negative cases in the triage group who were offered a pre-assessment by the PCH assistant but not referred to a follow-up assessment from a physician or nurse. Ideally, we would have a clearer picture of the outcomes of the referrals to additional PCH assessments and to external caregivers in order to know more about potential false positive cases. This would however require a more long-term follow-up of the children.

The generalisation of the results for the triage approach is of particular interest for other nations with similar population-based PCH systems. It depends on the characteristics of health care systems in other countries, such as how PCH is organised, financing, the structure of health care and cultural norms [19].

The impact of a triage approach on Dutch PCH
This study produced some arguments that support the consideration of implementing a triage approach in PCH.

Impact on accessibility
Appointment attendance rates were not adversely affected by the triage approach. This is an important result because it shows that access to PCH, a proven merit of the Dutch PCH system, was maintained.
We think a routine preventive programme should promote equity and access to assessments for the entire target population in order to reduce uneven access to care and to detect health problems in all children as early as possible.

**Impact on detection and on the delivery of care**

An important finding of our study was that the detection rates of the three health problems studied were comparable between the triage and the usual approaches. However, we found a marginal difference between the two approaches in the severity of the weight and psychosocial problems in subgroups of children identified with these problems by PCH. In the triage approach, children are first assessed by a PCH assistant who determines which children are referred for a follow-up assessment by a PCH physician or nurse. Since PCH assessments are typically straightforward and consist to a large extent of routine protocolled screening activities, it can be argued that pre-selection by PCH assistants could be a reasonable alternative to normal practice in terms of detecting health problems. However, it may be argued that triage by highly qualified professionals, such as physicians and nurses could improve the detection of health problems, although this was not confirmed by the current results of our study keeping in mind that we have no data about false negative cases.

The possibility that the triage approach could result in greater flexibility in the delivery of care for children at risk is important: case-finding should be an ongoing process and not only by a predefined schedule. In the usual approach, PCH professionals visit elementary schools only a few times a year to assess the children at the pre-determined ages (5 to 6, and 10 to 11 years). Routine PCH assessments at isolated points in time provide only snapshots of the dynamic process of development and growth. No problems will be seen in most children at these times. The PCH programme should respond, as they arise, to the care needs of children associated with health issues and stressful life events such as divorce or unemployment, which are more often suspected by school professionals who are in daily contact with parents and their children.

In the triage approach, physicians and nurses are less involved in the routine assessments, and this indeed appears to result in more opportunities to look at children with specific care needs: more children were assessed by PCH at the request of parents, well-child care professionals and, in particular, school professionals than in the usual approach, and this favours the early detection
of health problems. It is reasonable to suggest that the increase in PCH assessments on request in the triage approach can be attributed to the fact that the triage approach makes school professionals more aware that physicians and nurses can assess children on request several times in a year and at ages other than those used in the pre-defined scheme for routine assessments. This hypothesis would seem to confirm the thinking among school professionals that the triage approach delivers more appropriate support for children with specific needs than the usual approach [18].

Efficient use of resources
A balance must be struck between the cost of case-finding on the one hand, and expanding care delivery to optimise child health on the other. We found that the triage approach resulted in a cost reduction of one third in the age group of 5 to 6 years and a minimal cost reduction in the age group of 10 to 11 years. Routine PCH assessments with triage and task-shifting could cut back on the physician and nurse workload at this stage, and result in assistants being more involved, freeing up more time for physicians and nurses to assess children at risk. In broad terms, we found that physicians were less involved in the routine assessments with the age group of 5 to 6 years, and that nurses were less involved with the age group of 10 to 11 years, when the triage approach was used. This is an important result given the increasing shortage of PCH physicians and nurses in the Netherlands. Triage and task-shifting aims to deliver appropriate care to vulnerable children while maintaining the routine assessments for all children.

Implications for PCH services in the Netherlands
Changes in thinking about priorities in care and recent legislation affecting local policies require the transformation of the youth health care system. The decentralisation of policy development for the youth system managed by municipal authorities was initiated with the aim of improving the prevention of health problems and cutting the costs of specialised care [20]. The thinking is that municipal authorities will then have more opportunities to deliver the appropriate care for the needs of their citizens. The effectiveness, strengths and social relevance of PCH depend on addressing a number of challenges, to which we now turn.
Maintaining access to PCH and a wide reach

We have already mentioned the importance of access to PCH, and the need to use resources more efficiently. From a public health point of view it is important to maintain the low threshold, and wide coverage, of PCH in order to ensure the early identification of health problems, to promote the health of all children, and to provide a safety net for the most vulnerable groups of children and their families.

In the usual approach parents are always asked to be present at routine assessments of children aged 5 to 6 years but the policies of health services vary in this respect for children aged 10 to 11 years. In the triage approach parents are not present at pre-assessments at schools. However, in the triage approach parents are asked to fill out questionnaires about the health of their child and to give consent for the assessment. The parents are also given the option in the questionnaire to state whether they wish to attend the pre-assessment, but almost no parents avail themselves of this opportunity. Parents are expected to be present at follow-up assessments by physicians or nurses. A survey of parents using the triage approach showed that, although they were willing to be present at the assessment, parents appreciated not having to take time to do so, and that they had the opportunity to attend any follow-up assessment by a physician or nurse [21]. However, as a consequence, parents who do not require follow-up assessment have no face-to-face contact with PCH physicians or nurses in the triage approach, and this could reduce the involvement of parents and their children. Another consequence may be that it is not possible to deliver personal health education for all parents and their children. Furthermore, there are parents who are not capable of completing questionnaires, and therefore of granting consent for the pre-assessment. In these cases, there is no pre-assessment, and these parents are invited to be present at the assessment by a physician or nurse.

PCH services face the important challenge of reaching the largest number of children possible, and particularly vulnerable groups of children. To maintain the current high attendance rate, we advise PCH services to adopt a more active role in communicating the aims of PCH services, and to encourage parents and adolescents to complete questionnaires and attend routine PCH assessments. Questionnaires should also give parents the idea that they are welcome to ask for advice or an appointment with the physician or nurse. Digital options to
make or reschedule appointments are also important tools that can further attendance by parents and adolescents. To reach vulnerable or care-averse families and their children, PCH services should consider organising more outreach assessments, and home visits in particular, when parents and children do not attend the PCH assessments.

Tailoring the delivery of PCH care to the requirements of parents and children

There is an increasing emphasis on empowering parents so that they are more involved in care for the health and development of their children. This implies a greater focus by preventive services on positive parenting. However, unsolicited assessments, advice and support from PCH professionals are no longer accepted by all parents, who also find it less natural to turn to PCH because it does not always address their needs or the needs of their children. Some parents prefer to discuss behaviour problems with school or youth care professionals and medical problems with the GP. Nevertheless, other parents are unable to take responsibility for the health and development of their children and still others do not attend the PCH assessments.

To maintain the wide reach of the PCH system, PCH has to be a relevant partner that responds to needs and demands of parents and children. To make the system more relevant for parents, we advise more personalised assessments in consultation with, or in response to requests from, parents or adolescents. PCH has to be visible and easy to reach for parents and adolescents with requests for voluntary help by PCH. A shift is therefore required from supply-oriented care: PCH professionals need to establish a dialogue with parents and adolescents with the aim of customising the care they provide. PCH has started to develop instruments to facilitate the dialogue with parents, such as Starting Together ("Samen Starten") and Joint Assessment of Care Requirements ("Gezamenlijk Inschatten Zorgbehoeften") to improve engagement with parents [22,23]. More generally, PCH should be looking at the development of more customer-driven and innovative service delivery in co-creation with parents and adolescents.

We have emphasised the importance of making PCH more flexible to be able to address the needs of children and their parents. The description of the activities of the PCH in the Dutch National Professional Framework (LPK,
General discussion

Landelijk Professioneel Kader) provides enough openings for more flexibility of PCH care [24,25].

In addition to a triage approach of the routine assessments we advise the introduction of flexibility in the PCH assessments in order to respond to the varied care demands of children and parents. Greater flexibility is needed in terms of frequency of the assessments and of the assessment methods, such as group consultations, telephone assessments or contact through digital channels. Assessments should be arranged at the times and places that are most convenient for parents and children. Digital options such as videos may be helpful tools for the delivery and promotion of health care support on demand, not only in general but also in the periods between routine assessments.

Improving the efficient use of resources

We have already discussed the importance of using resources efficiently. Triage and task-shifting appear to have a positive impact on the use of budgets and human resources, and it is therefore possible that, within the constraints of the budget and skills mix available for routine PCH services, extra care can be provided for children with specific needs.

The Convention on the Rights of the Child asserts that every child has the same right to the highest attainable level of health [26]. However, there are remarkable differences in the health status of children. Apparent inequities in the health of subgroups of children are often linked to social inequity [27]. These considerations are important here since it has been found that freeing up resources for the health needs of the most disadvantaged makes primary care less costly for individuals and more cost-effective for society [28]. It is therefore reasonable to make an appraisal, from a preventive public health perspective, of the added value of universal prevention and positive parenting for all children by comparison with an increased focus on children at risk with the aim of reducing health inequalities between children. The results of our study of the triage approach show that it is possible to maintain routine assessments for all children while paying more attention to children at risk. However, more research into its effectiveness is needed.

We advise PCH services to engage in discussions with municipal authorities about the focus of their services in order to improve the efficiency and quality of PCH care. Policy needs to be developed targeting the optimal balance
between the aim of promoting the health of all children and the need for tailored PCH care for children and families at risk. The human resources and budgets available determine how much attention can be paid to these two areas [13]. PCH services must claim the resources saved by triage and task-shifting to provide extra care for children at risk. At the Gelderland Midden Regional Health Service, this has resulted in increases in the funds earmarked to address the health needs of vulnerable children.

Ensuring that PCH services respond to developments in the youth health care system

National priorities in health care and recent changes in legislation relating to the youth, educational and health care system require adaption of PCH services [20,29]. Following the recent introduction of new legislation relating to the education system (known as Passend Onderwijs) more complicated health problems are increasingly being referred by school professionals for assessment by PCH professionals from the Gelderland Midden Regional Health Service, possibly due to the fact that school and other health care professionals appreciate the broad social-medical scope of PCH professionals. Because the detection and referral of problems, and in particular psychosocial and parenting problems, are not the exclusive domain of PCH professionals, the coordination of health care and collaboration in networks of organisations targeting similar groups of children are important to detect these problems early and to provide parents and children with more efficient and effective support. Our findings for the triage approach suggest that it will encourage the ongoing formation of networks of this kind, and the position of PCH in them: school professionals using the triage approach appreciated the appropriateness of support from PCH and had more contacts with PCH. Furthermore, in the triage approach, PCH professionals visit schools frequently to assess children, both at their own initiative and at the request of school professionals [18].

We advise PCH services to create enough time for PCH professionals to collaborate with professionals from the school system and from the youth health care and primary care system, with the aim of improving joint commitment to early detection, and referral to specialised care if necessary. PCH professionals have a lot of information and knowledge about child growth and development. We advise intensive cooperation between the PCH professionals in school-based and other networks involving children in order to further the
exchange of information about children with health-related school problems and provide them with the care they need to complete their school careers successfully. PCH should be a community facility with a structural presence in schools or other public facilities to maintain accessibility and to encourage collaboration with parties such as school professionals and professionals from the youth health care and primary care system.

We also advise PCH physicians to connect with medical health care professionals such as GPs and medical professionals in youth health care with the aim of delivering more coordinated care.

**Implementation of a triage approach**

Implementing a novel triage approach with task-shifting in a PCH service requires approval from managers and the Health Care Inspectorate. The Health Care Inspectorate requires the number of routine assessments to be maintained but accepts flexibility in terms of which professional conducts the assessments [30]. Managers and municipal authorities who are responsible for PCH delivery and budgets have to be involved at an early stage. It is important to explain to municipal funding authorities that the aim of a triage approach is to improve the quality of PCH services and preventive care for children and not to cut costs. Throughout the process of implementation, PCH professionals, parents and other stakeholders should be involved and kept informed about the new PCH approach and the consequences for PCH care delivery.

We advise making it clear to managers and municipal authorities that time and funding are required to implement a new organisational model, while keeping PCH services in place. A quality-based development of a novel approach implies the close involvement of PCH professionals, as well as the bottom-up development of new protocols and guidelines. Funds and time must be earmarked for professionals so that they can evaluate the care delivered and in order to allow for the further development of the novel approach. Communications with all parties is an area that requires a lot of attention. Finally, we recommend the simultaneous involvement of support departments such as logistics and ICT in order to ensure that implementation is a success.

*Investment in the development of PCH professionals when a triage approach is used*

A better-targeted use of professionals’ competencies and knowledge is an important pre-condition for the successful introduction of a triage approach with
task-shifting. Tasks must be performed by the most appropriate professionals, and not necessarily the professionals who have done the work in the past. The skill mix should also be optimal, and this depends on the complexity of the tasks, the level of autonomy, and the education and competences of the professionals involved [31,32]. PCH assessments are typically straightforward and consist mainly of routine screening activities by PCH professionals for, in general, healthy children. The Gelderland Midden Regional Health Service has found that PCH can be re-organised if the skill mix of the professionals concerned is optimised. In the triage approach, PCH assistants assess children independently and they take over some of the screening tasks of the physicians or nurses. PCH physicians and nurses working with the triage approach assess only the children with suspected risk factors. Not only can this new approach result in career opportunities and skills development for the professionals involved, it may also may be a solution to the increasing shortage of PCH physicians and nurses.

We advise PCH services to invest in training for professionals and supervision to safeguard the quality of care when a triage approach is introduced since the process involves changes in task demarcation for PCH professionals. The Gelderland Midden Regional Health Service has determined the skill levels for all the tasks involved in the delivery of PCH and organised in-service training for assistants from PCH physicians and nurses. Physicians and nurses need to acquire the knowledge and skills required for demand-driven personalised care and also to maintain their levels of knowledge about healthy children. Cooperation and coordination between the different PCH disciplines are also needed because physicians and nurses have to transfer tasks to PCH assistants. This implies not only PCH-specific skills, but also general professional competences. Furthermore, PCH plays a role in public health services generally as a source of relevant aggregated information about the health status of children that is needed to advise municipal authorities and schools. PCH physicians and nurses must therefore be able to make a contribution in this area, and particularly in terms of providing relevant information to give policy-makers a better understanding of the health needs of their citizens. We advise PCH services adopting a triage approach to look at these competences during recruitment procedures and to invest in the training and time that PCH professionals need to perform these tasks.
**Investment in monitoring and quality assurance by PCH**

PCH services must study day-to-day practice to improve their quality and efficiency. Our study of the triage approach provides information about innovations in the organisation of routine assessments and enhances our understanding of approaches to monitoring growth and development in children. We have found that PCH services can conduct research in collaboration with research institutions and that physicians and nurses are interested in applied research looking at their day-to-day practice. The involvement of PCH professionals in research improves the relevance of the outcomes of research for day-to-day practice and the further dissemination of the results to further the ongoing professionalization of PCH.

Our experiences show that PCH services can contribute to applied research. Firstly, the full commitment of PCH services is needed to engage in research. Secondly, if data are used from PCH records, PCH professionals, ICT professionals and professionals managing logistics have to be involved bottom-up in all phases of the research to advise researchers about what is feasible. Thirdly, considerable attention should be paid to instructions about procedures and registration in order to obtain reliable data. And finally, the deployment of PCH and other professionals needs to be fully financed so that they can contribute to data collection and be involved in research [33].

**Directions for further research**

We have conducted pioneering research to explore new ways of organising the routine assessments implemented by PCH. The initial results produced by our study appear to indicate that more efficient and personalised care delivery for children of school age is possible with a triage approach. The results are encouraging but our study suffers from a number of limitations. Additional research is needed in the areas covered by this thesis to further substantiate our results. To begin with, more needs to be known about the actual quality of the detection of health problems and referrals to extra care using a triage approach by comparison with the usual approach. An examination of the outcomes of referrals to additional assessments by PCH professionals or external specialised care-givers could be a useful source of information about the accuracy of health-problem detection. To determine the numbers of children who have been missed in either of the two approaches or who have been assessed mistakenly as having a health problem – the false negative and
false positive cases – we need a long-term study with a large cohort of children and appropriate criterion instruments (“gold standards”).

We have analysed three health problems for which commonly used standard screening guidelines exist. However because there are no gold standards in PCH for health issues such as lifestyle problems, parenting problems and child abuse, studying the sensitivity and specificity of the triage approach represents a challenge.

The results of this study are relevant for preventive child health care in the elementary school age group. More research is also needed into the effects of the triage approach in well-child care (from birth to four years of age) and in secondary schools to allow for the generalisation of the effects of the triage approach.

Surveys of satisfaction among parents and adolescents with the care delivered by the two approaches are also needed, as is investigation of the satisfaction of the different PCH professionals with the two approaches.

Longitudinal research into the impact of the triage approach on the long-term need for care would be advisable to enhance our understanding of the equity of care distribution to the children needing health care and the optimal balance between preventive care for all children and extra care for children at risk. It will also be interesting to establish the impact of the triage approach when it has been implemented over a longer period of time. Moreover, further research is needed to learn more about the cost efficiency of both approaches. Longitudinal research is needed to investigate the costs of referrals to additional assessment by PCH or to external services and, in that way, to determine the cost-effectiveness of the implementation of the triage approach. Further investigation is also recommended of the factors that affect access to PCH professionals. A study of determinants such as the needs of school, youth and health care professionals, and collaboration between the PCH and school systems, as well as factors in the social and political environment of PCH, may teach us more about how to improve children’s health and well-being.

At the time of our study, most PCH services organised routine assessments in the same way. In future research, it will be very difficult to compare PCH approaches with usual care because most PCH services have already made their organisations more flexible and adapted to challenges in society. Follow-up research by TNO, Dutch Child Health Knowledge Centre (NCJ) and four PCH
services has now been initiated to compare the impact of different approaches on the flexible delivery of PCH. It will compare the long-term effects on the detection of health problems and referral to care associated with different approaches to the flexible delivery of PCH services involving different skill mixes among PCH professionals and substitutes of face-to-face contacts, such as e-consultations.
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