Clear and user-friendly communication materials are critical to improve treatment outcomes. There are a number of reasons why patients may not adhere to treatment nor complete the full course of medication. A study that examined adherence to an artemisinin-based combination therapy found that many patients stopped their medication once they felt better, or failed to complete the course because there were too many tablets. Others wanted to save some of the tablets for future episodes of malaria, as in many regions patients have to travel a long way to their first point of care. In addition, adherence to the dosing schedule may be negatively impacted when patients or caregivers struggle to understand dosing instructions. This can be particularly problematic in populations with low levels of literacy. Providing simple patient information and pictograms has been shown to improve adherence.

In collaboration with in-country partners MMV has invested significant resources in designing and testing packaging and visual aids to help ensure that the drug administration process is clearly understood by both patients and health workers.

"By listening to the voices of patients and healthworkers who use medicines in the field, we improve our understanding of the ‘human factors’ that can increase the impact of correctly used drugs – and we adapt our materials accordingly."

George Jagoe, Executive Vice President – Access & Product Management, MMV

Defeating Malaria Together
Listen and learn: using real-world interaction to develop user-friendly materials

By field testing communication materials, comprehension can be evaluated in a “real life context”. The primary challenge in field testing is to incorporate end-user comments in real time, and adapt materials until they are readily understood by a majority of users.

Dosing instructions are often given verbally, with the patient or caregiver having only the information provided on the packaging as a reminder. Pictorial guides on packaging have been shown to increase understanding about the timing of doses and the importance of completing a course of therapy. The purpose of these visual aids is to provide clear, simple, step-by-step instructions on what actions to take. To be successful, these resources need to meet a number of criteria.

They must:

- Be clearly understood by a majority of end users
- Present a message that is relevant to the user
- Convey a message that convinces the user to undertake the desired behavior
- Be socially and culturally acceptable to users.

To develop packaging and visual aids that meet these criteria, MMV field tests the early versions of the materials with end users in endemic countries. A key feature of field testing is the iterative process. The “repeat factor” is important, as gaining feedback from different groups of respondents expands the range of perspectives and helps to achieve a balanced view. At each stage, the designer and researchers redesign the materials in response to the comments received. Because the designer is actually present in the field, talking with the end-users, they are able to redraw materials ‘on the spot’, and gain immediate feedback on these modifications. This innovative approach results in the materials evolving during the field work until they effectively communicate to the majority of likely end-users.

Arriving at this point in the cycle is rewarding, as the materials have not just been designed for end users, but with them. Such materials can help new medicines deliver greater health impact.
Most antimalarials come in tablets of different strengths or in age/weight band specific packs with different numbers of tablets. This approach complicates stock management, forecasting, ordering and shipping. For example, a health centre may find itself with too many adult packs and too few child packets.

To avoid these problems, Pyramax®, the fixed-dose combination of pyronaridine and artesunate co-developed by MMV and Shin Poong Pharmaceutical, is dispensed in blister strips of three tablets of the same strength. Rising with body weight, the daily dose is 1, 2, 3, or 4 tablets, to be taken for 3 days.

To facilitate correct dispensing particularly at the community level, user-friendly packaging with visual instructions was particularly important.

The dosing chart appears on the Pyramax dispensing pack to guide dispensing.

**Evolution of the Pyramax® dosing chart during field-testing**

![Dosing Chart Images](image)

**Key findings**

The field testing took place in Cambodia, India, Kenya and Senegal and involved 468 interviews with doctors, nurses, community health workers, caregivers and patients.

Two key pieces of information that the Pyramax® dosing chart needed to convey were:

1. The age-group for each weight-band dosing category (as Pyramax® does not come in age-specific packs)
2. The dose is given once a day (not twice a day, as is well known for artemether lumefantrine)

Results of the field testing showed that the patient illustrations helped the drug dispenser administer the correct dose. The cartoons were considered ‘friendly’ by interviewees, who thought they were an appropriate way to distinguish between the different age groups. The ‘once a day’ message needed more refinement. The sun and moon cyphers were removed as too many people interpreted this as one dose in the morning and one in the evening. To emphasize taking the tablets in one go, the dose was shown in the palm of the hand. This helped to clarify the message for end users. Simple text with a clean uncluttered design was most understandable.
Making the best use of primary packaging: SPAQ-CO™ and Eurartesim®

Very often patients/caregivers receive only the blister pack accompanied by oral instructions for the administration of the treatment. Once at home the primary packaging is the only thing patients/caregivers have to help them remember how and when to take the medicine.

Given the limited space on an antimalarial drug package, the messages have to be very clear and concise. By testing different packaging designs with end users, MMV has helped to generate innovative packaging that facilitates correct dosing and adherence to treatment whilst also meeting WHO requirements on packaging antimalarial medicines.6

In developing user-friendly packaging, we are working to accommodate competing requirements: communicating a large amount of information on a restricted space, and keeping packaging costs as low as possible. Simple, clear design is crucial to convey this information as can be seen below from the blisters for SPAQ-CO® and Eurartesim® case study.

SPAQ-CQ™ Blister

MMV worked with Guilin Pharmaceutical to obtain WHO prequalification for a co-blistered combination of SPAQ. Sulfadoxine-pyrimethamine (SP) and amodiaquine (AQ) is the WHO-recommended treatment for seasonal malaria chemoprevention during the malaria transmission season for children aged between 3 and 59 months in the Sahel region.

Eurartesim® Cambodia packs with user-friendly dosing chart and color-coding to distinguish different age groups

Eurartesim® is a fixed-dose combination of dihydroartemisinin-piperaquine (DHA-PQP), developed by Sigma-Tau in partnership with MMV for the treatment of uncomplicated P. falciparum malaria. In October 2011, the EMA granted marketing authorization for Eurartesim®, in October 2015, WHO granted prequalification.
In addition to our work in developing user-friendly packaging, MMV has worked closely with a variety of partners to create toolkits to support countries implementing seasonal malaria chemoprevention (SMC), and to help health workers correctly prepare and administer injectable artesunate for the treatment of severe malaria. All of these materials are available to use on the MMV website (www.mmv.org/access/tool-kits). MMV’s visual aid for injectable artesunate has been widely adopted by multiple countries, including Cameroon, Cape Verde, Democratic Republic of Congo, Kenya, Malawi, Nigeria, South Africa, Uganda and Zambia. Similarly, the launch of the SMC toolkit across the Sahel sub-region of West Africa has been supported by the West Africa Regional Network (RBM-WARN) and is recommended as a useful resource by the WHO.7

We share the knowledge we have gained, beyond malaria. For example, we recently helped PATH develop packaging for a new dispersible tablet form of amoxicillin.

Working on these projects has given MMV considerable experience in designing and evaluating training materials for use in developing countries, and we are keen to share this experience. Through partnership and collaboration, the MMV Access and Product Management team will continue to work towards maximizing treatment outcomes by producing user-friendly materials to support new medicines.

“The injectable artesunate (Inj. AS) visual aids are a very good initiative. They are very important as reference materials for health care workers. They really assist by providing information on administration including reconstitution and dosing of Inj. AS. Trainings on administration of Inj. AS would have been very difficult and time consuming without them.”

Dr. Chalwe, Maina Soko Military Hospital, Lusaka National trainer, Administration of Inj. AS.
Coartem® Dispersible packaging developed in collaboration with Novartis.

250 million treatments of Coartem® Dispersible (artemether-lumefantrine) have been delivered to 50 malaria-endemic countries since launch in 2009.

MMV and Novartis’ game-changing work on Coartem® Dispersible has inspired new ways of thinking within the PATH Pneumonia Innovations team and among others working on making medicines more accessible. Their ongoing generosity and willingness to share their time, resources, and expertise demonstrate their keen understanding of the fact that we are all, in theory and in practice, working towards a common goal.

PATH Pneumonia Innovations team

7. WHO information note. Addressing the current medicine shortages for Seasonal Malaria Chemoprevention April 2015

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