# HISP UiO Strategy

# 2014-2016

## 1.1  Mission Statement

> The overall goal of the Health Information Systems Programme (HISP) at the University of Oslo is to enable and support countries to strengthen their health systems and their capacity to govern their Health Information Systems in a sustainable way to improve the management and delivery of health services.

HISP is based at the Department of Informatics at the University of Oslo (HISP UiO). The core focus of HISP UiO is the open-source DHIS 2 software, its implementations and related capacity building in countries and regions. DHIS 2 is developed and implemented through a network of partners (the HISP network), including universities, ministries of health, international agencies like WHO and NORAD, and implementing partners like HISP India and HISP South Africa. The various members of the network play different roles, ranging from developing human capacity at different levels, managing software development, coordinating educational linkages and helping create strong information cultures within national health services.

## 1.2  Framing HISP UiO in Global Initiatives

The HISP UiO effort takes great inspiration from the Call for Action on Health Data from Eight Global Health Agencies[1] highlighting *"demands for statistics that accurately track health progress and performance, evaluate the impact of health programs and policies, and increase accountability at country and global levels"*. Whereas many development partners concentrate on data for specific health programmes and diseases (e.g. AIDS, tuberculosis and malaria), the strategic focus of HISP UiO is on information systems to support the "Continuum of Care" for reproductive, maternal, newborn and child health (RMNCH)[2] and on Recommendation 3 from the Commission on Information and Accountability for Women's and Children's Health (CoIA)[3]: *"By 2015, all countries have integrated the use of Information and Communication Technologies in their national health information systems and health infrastructure."* HISP UiO focuses on moving from mere data collection to an emphasis on data quality and data use, and from fragmentation of information systems to integrated architectures. Furthermore, HISP UiO promotes the connection of health workers at the point-of-care and district level managers with national, regional and global Health Information Systems. DHIS 2 activities are ongoing in 55% of the 49 CoIA countries in the Global Strategy. This also includes 70% of the 20 Global Fund High Impact Countries.

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[1] http://www.plosmedicine.org/article/info%3Adoi%2F10.1371%2Fjournal.pmed.1000223
[2] http://www.who.int/pmnch/about/continuum_of_care/en/
[3] http://www.everywomaneverychild.org/resources/accountability-commission

## 1.3   Joint 3 Donor Effort

The interest and demand from countries and donor organisations to implement DHIS 2 is increasing rapidly, and at the end of 2013, 31 countries are in various stages of testing, customising and partly or fully implementing the software. In order to meet the demand for implementation support and further development of DHIS 2, a coordinated support agreement has been made between Norad, Global Fund and PEPFAR as follows:

- Norad continues to provide core funding to the HISP UiO 'Centre of Expertise'. This funding targets the core development of the DHIS2 platform and staff for coordination and support of implementation in countries
- The Global Fund is supporting the implementation of DHIS 2 in countries
- PEPFAR has decided to use DHIS 2 for internal reporting from their activities in countries and will therefore fund further development of DHIS 2 to support their specific reporting requirements, within the scope of country-owned health information systems

## 1.4   Emerging Requirements Influencing the Strategy

There are four important trends and developments influencing the HISP UiO strategy and plan:

**Sustaining existing DHIS 2 implementations**
DHIS 2 is now established as a central Health Information System in many developing countries. It is the obligation of HISP UiO to support these implementations by maintaining a strong and stable DHIS 2 core and advance it further to meet emerging requirements and technological innovations, as well as sharing research, learning, training material, and best practices that are integral to successful evolution of country health information systems.

**The need to progress from simply capturing data to improving data-use and data-quality**
In most DHIS 2 implementations, data collection has improved significantly, but quality and use of data for action remains inadequate. There is a need to address these shortcomings along two dimensions:

1. Creating strong *information cultures*; development of better routines and procedures for data use – and thereby also quality control. To improve the management of health services in terms of e.g. motivation of staff and prioritisation of supervision activities, there is a need to ensure that reports and data analysis trickle down. HISP UiO approaches these challenges through encouraging methods such as data use workshops and quarterly review meetings making active use of data to assess achievements against targets and plans at all levels of the health services, and
2. Improving the range and usefulness of *information products;* innovative methods in presentation of information using dashboards, graphs, maps and mobile telephones customised for the various user groups. We need to leverage on the proliferation of advanced mobile phones and the fact that Internet is becoming accessible on the sub-district level and even down to the health care worker. HISP UiO and DHIS 2 enable transparency by providing access to anonymised health data to the wider population through web-based health data portals.

**Moving from aggregates to more fine-grained data**

There is a general trend towards increased granularity of data. Examples are electronic registers tracking patients in health programs, such as tracking ANC clients through delivery to post-natal care and immunisation programs for the infants; computerisation of paper based facility registers; HIV/AIDS and TB registers; electronic registers for birth and cause of death registration. It is important to ensure that these different systems are integrated in the overall national HIS framework.

**Increasing focus on integration and architectures**

It is crucial to avoid increasing the gap between silos of care – i.e. programs collecting loads of data relevant for themselves, but nothing for other vast and important areas. HIS architectures are seen as a way to try organise the increasing number of systems in a 'system of systems' which is governed by standards for interoperability and in particular authoritative electronic registries that provide shared standards for data and indicators, identification of health facilities and licensing of health providers. But still, vertical health programs are posing different and sometimes conflicting demands. In this picture, the roles of DHIS 2 in the wider health systems are not given – should it only cover health information and statistics, or should it (and eventually in what way) also support other areas such as logistics, financing and human resources?

## 1.5 The Three Strategic Focus Areas of HISP UiO

The HISP network has been developed as a global "network of action" since its inception in South Africa in the 1990's. The HISP network is still gaining momentum after 20 years of history, illustrating the sustainability of this approach. The approach of HISP UiO is based on understanding interventions as but one element in a larger network of action in order to ensure sustainability. The focus is thus on the sharing of best practices and products between partners which are actively engaged in HIS strengthening, such as universities, Ministries of Health, international agencies like WHO, PEPFAR and Norad, and in-country implementing agencies like HISP South Africa. Each participant in the network may be weak when it comes to the application of ICT in the health sector, but gain strength by mutual support and collaboration through networks of action.

The HISP UiO strategy has three strategic focus areas. They are interlinked and based on and fostering the further development of the network of action:

| Strengthen Health Information Systems |
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| Develop and Govern DHIS 2 |
| Training, Education and Research |

### 1.5.1 Strengthen Health Information Systems: *Information for Action*

HISP UiO has a strategic focus on strengthening health information system based on *information for action*. The guiding principle is that data collection must focus on data that are actually used to calculate indicators and linked to targets in order to measure achievements. All HISP UiO activities are directly or indirectly geared towards information for action.

A common challenge at health centres, hospitals and districts is that different information systems (related to e.g. human resources, finance, and different health programmes) are fragmented. The consequence is data fragmentation, duplication and poor data quality. The HISP UiO strategy is to improve this situation by working for integrated health information architectures. Integrated architectures support the ease of information access for managers across programmes, units and systems. The basic principle is that DHIS 2 is used as an integrated data warehouse including data from different sources, health programs and systems. A key part of the HISP strategy is therefore to collaborate with multiple actors such as ministries of health, including both dedicated HMIS units and the users of information within the various health programmes. Additionally, HISP UiO engages closely with NGOs, global health agencies and donors, in line with the principles of the Paris Declaration[4]. The growth of the partner network also underscores the need for increased efforts around interoperability, in particular as part of the Open Health Information Exchange (OpenHIE)[5] community, enabling synergies with other software projects[6]. The main output of HISP is *integrated health management information systems*. Also, in some regions, data from these national systems is exported to regional health information systems, where country indicators can be compared and regional action taken. Partners also want to establish such an integrated system for their international activities, constituting a third type of implementation.

HISP UiO offers DHIS 2 as a tool that supports the building of national health information systems to improve information for action. In the current DHIS 2 software development strategy, the aim is to better reach out to managers with improved and more relevant data and to reach out to the lower level facilities and communities through mobile devices making data reporting more timely and data more relevant. Develop and Govern DHIS 2 is another strategic focus area of HISP UiO and is described in the next section.

Health professionals skilled in analysing indicators and data quality constitute a necessary ingredient in the integrated health information system. Through training, education and research, HISP UiO focuses on information use. In particular, data use workshops is a part of the DHIS 2 Academy and is used in implementation projects to improve data quality and institutionalising data use in relation to for example quarterly and annual review processes. HISP UiO also supports reviews of data collection tools, promoting action-oriented articulation of information needs. Training, Education and Research constitute another strategic focus area of HISP UiO describe below.

To summarise, the strengthen health information systems strategy has the following focus areas:

| **1. Improved DHIS 2 software** |
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| - Improved and more relevant data<br>- Facilities and communities reaching through mobile devices |

| **2. Reduce Data Fragmentation** |
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| - Using DHIS 2 is as an integrated data warehouse<br>- Participation in international interoperability and standardisation efforts |

| **3. Information Use Training** |
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[4] http://www.oecd.org/dac/effectiveness/parisdeclarationandaccraagendaforaction.htm

[5] http://ohie.org

[6] Some examples include OpenMRS, iHRIS, Formhub, RapidSMS, OpenXdata, CommCare, MOTECH

> - Data use workshops in implementation projects
> - DHIS 2 Academy modules on information use

**Table 1. Strengthen Health Information Systems Focus Areas**

### 1.5.2   Develop and Govern DHIS 2: Open Source Software

DHIS 2 is a Health Information System based on 7 central functional components: facility management/register and indicator management/register, as well as tools for data collection, data processing, data analysis, presentation, and communication. The platform encompasses an extensive Web-API and can be characterised as being open source, accessible, generic, and extendible. It offers scalability, robustness, and is proven through implementation as a core national Health Information Systems in different contexts across a range of countries.

The focus of HISP UiO is to provide DHIS 2 as a *health information system* to be used as a tool for collection, validation, analysis, and presentation of aggregate health indicators and transactional health data used for community health and primary health care.

There is an increasing demand from a variety of actors to use DHIS 2 for other purposes and in other domains. Strategically, HISP UiO is approaching this situation by focusing on maintaining DHIS 2 as a coherent and complete "best practice" application platform based on an integrated data warehouse architecture. This includes:

- Standard based interoperability with other data sources and systems
- Seamless extension of the statistical data to case based data enabling "drill down"
- Giving attention to new demands as a potential creep in scope that is risky as it may compromises the DHIS 2 software quality in terms of architecture, flexibility, maintainability and scalability
- Integrate if possible with other open source platforms covering adjacent domains such as health systems financing, health workforce, medicines and health products, governance and service delivery[7]
- Carefully expanding the core where it is relevant to support basic HMIS registry needs  where other options are lacking (currently logistics, vital events and tracking)
- Move towards DHIS 2 as a platform, allowing local development and improvisation through a Web-API and Apps. This will both isolate and preserve the DHIS 2 core
- Any changes in strategy and scope will discussed and consensus sought in the DHIS 2 community. The final decision however being taken by the HISP UiO Management Group

A new version of the DHIS 2 software is released quarterly. The development process is built around launchpad.net, a collaborative platform for open source software projects. This web platform contains the source code, detailed plans for future releases, bug reports, and logs of all changes to the source code. Public mailing lists for developers and users, respectively, constitute the main communication channels for technical discussion and queries. The following principles guide the software development:

- Generic and reusable features for a global user base
- Rapid response to user needs – new release of the core platform every quarter

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[7] See http://www.who.int/healthsystems/topics/en/

- Innovation through in-depth involvement of the core team in country implementations
- Adoption of community-developed standards for data exchange
- Enabling local innovation/extensions based on open Web-API and App Store
- Transparency and online visibility (roadmap, bugs, releases)

To summarise, the DHIS 2 software development strategy has the following focus areas:

| 1. Secure a strong and future oriented software core |
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| Maintain and advance DHIS 2 as a Health Information System<br>- Develop functionality to meet emerging requirements<br>- Keep at pace with emerging technological trends<br>- Maintain code and improve code efficiency<br>- Maintain architectural integrity |

| 2. Decentralise by promoting a community of app developing partners around DHIS 2 |
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| - Evolve from DHIS 2 as an application to a platform<br>- Promote an community of app developers working in areas that require special features/adaptations<br>- Strengthen the Web-API to allow other systems to access data more widely |

<div align="center">Table 2. Software Development Focus Areas</div>

The DHIS 2 software development strategy has the following *functional* focus areas:

| 1. Reach out to decision-makers with improved data |
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| Move towards more relevant, timely and appealing data for decision makers<br>- Improve data visualisation<br>- Utilize social media features extensively<br>- Offer information through multiple channels (message boards, email, SMS etc.) |

| 2. Reach out to the facility and community levels through mobile devices |
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| Enable data collection and basic data use at the lowest level of the health system<br>- Offer robust and simple applications connected to a stable national backbone<br>- Support all devices at hand (PC, tablet, smartphones, low-end phones etc.)<br>- Offer automated messages (SMS) to communities and clients of health programs |

| 3. Support basic HMIS registry needs related to logistics, vital events and tracking |
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| Support key registering data underpinning mother and child health in the domains of:<br>- Management of the logistics of essential commodities<br>- Case-based data on vital events such as births and maternal and neonatal deaths<br>- Tracking of individuals over time as part of longitudinal health programs |

| 4. Support data exchange with other applications |
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| Make data available to other applications by implementing the community-developed Open Health Information Exchange (OpenHIE) standards |

| 5. Secure the privacy of beneficiaries by securing patient-related information |
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| Implement security measures in line with global standards (e.g. US and EU) on patient security and privacy. This work will be carried out in close collaboration with expert partners who have extensive experience in this domain, e.g. the Norwegian Institute of Public Health and Population Services International (PSI). |

<div align="center">Table 3. Software Development Functional Focus Areas</div>

### 1.5.3   Training, Education and Research: Building Human Capacity

The HISP "network of action" has been developed through mutual synergies between software development, implementations, and training, education and research. To address the rapid growth of

requests for more Academies and training workshops, the DHIS 2 Academy program will be scaled up to include an online component as well as more tailored and specialised training sessions catering for several types of participants and DHIS 2 topics/interest areas. While the first scale-up phase will require some additional resources, the long term goal of the Academy program is to become self-sustainable, and in the longer term a potential source of income for regional/national HISP partners. Establishing strong local institutional bases for capacity building is important to achieve this goal and HISP UiO will continuously seek to establish new and support the strengthening of existing institutions and NGOs regionally and locally.

Academic institutions and education are on the top of the capacity building pyramid, and HISP UiO has so far graduated 24 PhD students and established nine master programmes in partner countries, funded by through the Quota scheme, Norwegian Centre for International Cooperation in Education and the Norwegian Research Council. For development of academic competence in countries not covered yet and for establishment of academic courses, HISP UiO aims at graduating three PhD candidates per year and support establishment of academic courses on request from partnering universities.

Through action-research based participation in software development and implementations, HISP UiO generates high quality research outputs through PhD-students, many of whom return to their home country to lecture at universities, support local companies and support and give advice to Ministries of Health, donors and NGOs. Thus, they become key actors in the establishment of local and regional nodes to support the strengthening of local capacities and health information systems. Through previous research and education grants, HISP UiO has already established academic capacity in health information systems at Universities in Ethiopia, Malawi, Mozambique, Sri Lanka and Tanzania. These universities can graduate masters in the area for English and Portuguese speaking students. Computer based health information systems is still lacking in most pre-service education of health staff. Health colleges need to include this subject in their curricula and have teachers who also can get updated from a national academic centre. Thus, there is a need for academic groups in other countries as well or regional cooperation where feasible. Currently, there is a strong need for a francophone centre.

The HISP UiO training strategy is based on Training of Trainers; developing local capacity that can adequately cover training needs for the majority of DHIS 2 users. This approach is based on developing local or regional institutional bases for capacity building with a basis in a local University and related Master's programmes or a strong NGO.

HISP UiO established the DHIS 2 Academy program in 2011. The Academy is a series of annual regional training seminars in West Africa, East Africa, Southern Africa, Asia, and Latin-America for DHIS 2 implementers and trainers at regional and country level. The DHIS 2 Academy project will be further developed and rooting it within a network of regional and local partner institutions will be essential for its long term sustainability.

To summarise, the DHIS 2 strategy on training, education and research has the following focus areas:

| **1. Training of Trainers Approach** |
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| - Scale up and professionalise the DHIS 2 Academy training program |
| - Continuously improve tools and teaching materials |

| **2. Build Institutional Bases for Capacity Building Locally and Regionally** |
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| - Build institutional capacities to give Masters programmes locally and regionally<br>- Gradually make local and regional institutions run the DHIS 2 Academies based on participation fees |

| **3. Mutual Synergies Between Research and Implementations** |
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| - Recruit and involve PhD students in implementation projects<br>- Graduated PhD students take key roles in Universities, Ministries of Health and other organisations |

| **4. Through Partnerships Strengthen PhD Education** |
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| - UiO can only educate around three PhD students per year – but based on partnerships with local Universities with established research groups this capacity is strengthened |

**Table 4. Training, Education and Research Focus Areas**

## 1.6    HISP UiO Management Group and Staff

### 1.6.1    The HISP UiO Management Team

HISP UiO is governed by a management group located at the University of Oslo. This group has monthly meetings and has the following participants: Project manager, senior academic staff, country implementation coordinator, technology coordinator, partner coordinator, open source community manager and secretary. The overall aim of the HISP management group is to secure a sustainable DHIS 2 core by proactively handling changing demands. The mandate of the management group covers 5 areas to focus on: DHIS 2 Software Development; Implementation Activities by HISP UiO Employees; Implementation Sub-contracting; Interaction with Partners; and Coordination of DHIS 2 related research.

### 1.6.2    The HISP UiO Team

HISP UiO is the coordinating and governing body for DHIS 2. As a result of the rapid expansion of DHIS 2 implementations over the last couple of years, both in countries and within major global organisations (e.g. PSI, PEPFAR, and IRC already committed; while UNICEF, MSF and others are showing interest), as well as the maturation and deepening of existing implementations (e.g. in Kenya, Uganda, Ghana, Rwanda), the HISP UiO team is experiencing a relatively dramatic scale-up of requests: for new features, to support country implementations, and partner relations and initiatives to coordinate. This demand calls for more resources and also for a more sustainable organisational project structure, including software development, country support, capacity building, and partner relations. HISP UiO will implement the following changes to meet this new demand:

1. Move towards a DHIS 2 software architecture that facilitates more community involvement and a more distributed and decentralized development approach
2. Move towards an organisational structure with more nodes/teams of high quality software developers to be better prepared for scale-up of the software development team and to reduce the pressure/workload on a single core team in Oslo
3. Strengthen a few selected nodes/teams of expert implementers in the different regions to provide/maintain "closeness to the field" in a time of rapid expansion of the number of users and user organizations globally. These nodes will also play a major role in capacity-building activities and be a major resource for country support
4. Scale up country support in close collaboration with the Global Fund and other partners.

5. Strengthen the coordination of the DHIS 2 activities with more full time staff in Oslo coordinating software development, country implementation support, partner relations and open source community development.

Following the approach outlined above the HISP team in Oslo will have the following 8 full time externally funded staff:

- Technology coordinator
- Country implementation coordinator
- DHIS 2 community coordinator
- Mobile development coordinator
- Partner coordinator
- 3 software developers

This team will be co-funded by Norad and PEPFAR.

### 1.6.3   Software Development Nodes and Hubs

The developers at UiO are supported by developers in Ireland, USA, South Africa, India, and Vietnam:

| **HISP US** |
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| Many years of experience from PEPFAR reporting and patient level systems in Kenya. Experienced software developer. |

| **Wooza, Ireland** |
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| Interoperability and standards development. Also PhD student at University of Oslo. Long experience from international standards development. |

| **Vietnam** |
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| Tracker development coordinator and architect. PhD from University of Oslo and many years of DHIS 2 implementations and project management. |

| **HISP Vietnam** |
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| Team of developers that work both on software development for global use and support implementations in Vietnam and the region. Software development focuses on mobile clients and DHIS 2 Tracker. |

| **HISP India** |
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| Big team of software developers and implementers supporting implementations in India and the Asian region as well as contracted software development work for WHO, PATH and others. One new senior system architect position will strengthen the software development team at HISP India and facilitate closer collaboration with software developers in Oslo, with a goal of integrating more of the HISP India innovations into the core software platform available to all countries. |

| **HISP South Africa** |
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| HISP South Africa, an NGO with 30+ staff and deep DHIS and public health expertise. Scaling up their technical capacity on DHIS 2 to support the on-going transition in South Africa from DHIS 1.4 to DHIS 2 and an increasing number of implementations in the region. A new DHIS 2 software development team is being established at HISP SA including one position sub-contracted from HISP Oslo. The team will work closely with Oslo to become a key hub for the core software development. |

*Table 5. Software Development Nodes and Hubs*

### 1.6.4   Implementation Expert Nodes

The HISP network has several expert nodes with very experienced DHIS 2 implementers and with well-established communication with the core team in Oslo.

| HISP Uganda |
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| A newly established HISP node with staff that have been highly involved in the DHIS 2 implementation in Uganda. This team has been very active in piloting new innovative solutions for tracking of maternal and child health clients and use mobiles for reporting and communication. HISP Uganda has also been a key partner in hosting DHIS 2 academies in the East Africa region. This team has been sub-contracted by UiO as part of the SMGL activities in Uganda for the period Nov 2013 to June 2014 and we plan to continue these and other activities beyond the SMGL funding. |

| UDSM, Tanzania |
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| A DHIS 2 team at University of Dar es Salaam (UDSM) has been financed by Norad (through UiO) for several years and provided core technical capacity to drive the national DHIS 2 implementation in Tanzania. Since the end of 2013, DHIS 2 is used in all districts, and it has already been set up as an integrated HIS system at the MoH with the involvement of all major programs. This team has built up a lot of experience with DHIS 2 implementations over the years and have been innovative in several areas, including mobile reporting for disease surveillance, and logistics management. The Tanzania team also provides important technical support for the East Africa Community data warehouse project. |

| HISP Nigeria |
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| HISP Nigeria is an NGO with 8 years of DHIS implementation experience, and has been the main technical support provider to the Federal MoH in the recent transition from state-level DHIS 1.4 implementations to a national DHIS 2 system. The team has also been involved in several mobile implementations and is driving a logistics management pilot in Benue state as part of the UNCOLSC work. The Nigerian implementation poses a lot of interesting challenges in terms of scaling, and HISP Nigeria is therefore providing important feedback to the core development process. |

| HISP West Africa |
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| HISP West Africa is a recently established NGO built around a UiO/HISP PhD student from Togo who has provided technical support on DHIS 2 implementations to several countries in the region for more than 5 years. To support the rapid scale up of DHIS 2 implementations in West Africa and the on-going work with WAHO/ECOWAS on a regional data warehouse it is important to support the strengthening of this strategic node in the HISP network. |

**Table 6. Implementation Expert Nodes**

## 1.7   HISP UiO 2017 – Target Picture

The target picture for 2017 is according to the three strategic focus areas as follows:

| Information Used for Action |
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| - Where DHIS 2 is implemented, relevant information reaches decision-makers as well as facility and community level and acts as a basis for information for action<br>- Strengthening health information systems, DHIS 2 is considered as improving decision making and governance in the health sector, leading to improved health services, resource utilization and health in the population<br>- Where implemented, DHIS 2 has a clear role in reducing fragmentation |

| "State of art" Open Source Software |
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| - DHIS 2 appears as flexible, maintainable and scalable<br>- DHIS 2 is considered as a "state of the art" health information system serving the needs for collection, validation, analysis, and presentation of aggregate health indicators and transactional health data in community health and primary health care<br>- DHIS 2 has a clear and well communicated role in health system architecture, and offers the |

| necessary integration points to other important systems |
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| Strong Base of Human Capacities |
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| - DHIS 2 training is self-sustained based on local and regionally hosted Academies<br>- DHIS 2 implementation and support is self-sustained based on implementation expert nodes<br>- While HISP UiO is responsible for DHIS 2 core development, a network of software development nodes are actively contributing to extend the platform as well as improving the core<br>- PhD- and Master-students are actively involved in DHIS 2 implementation projects – and graduated students have central roles both in Universities, Ministries of Health and other organisations |

**Table 7. Target Picture**