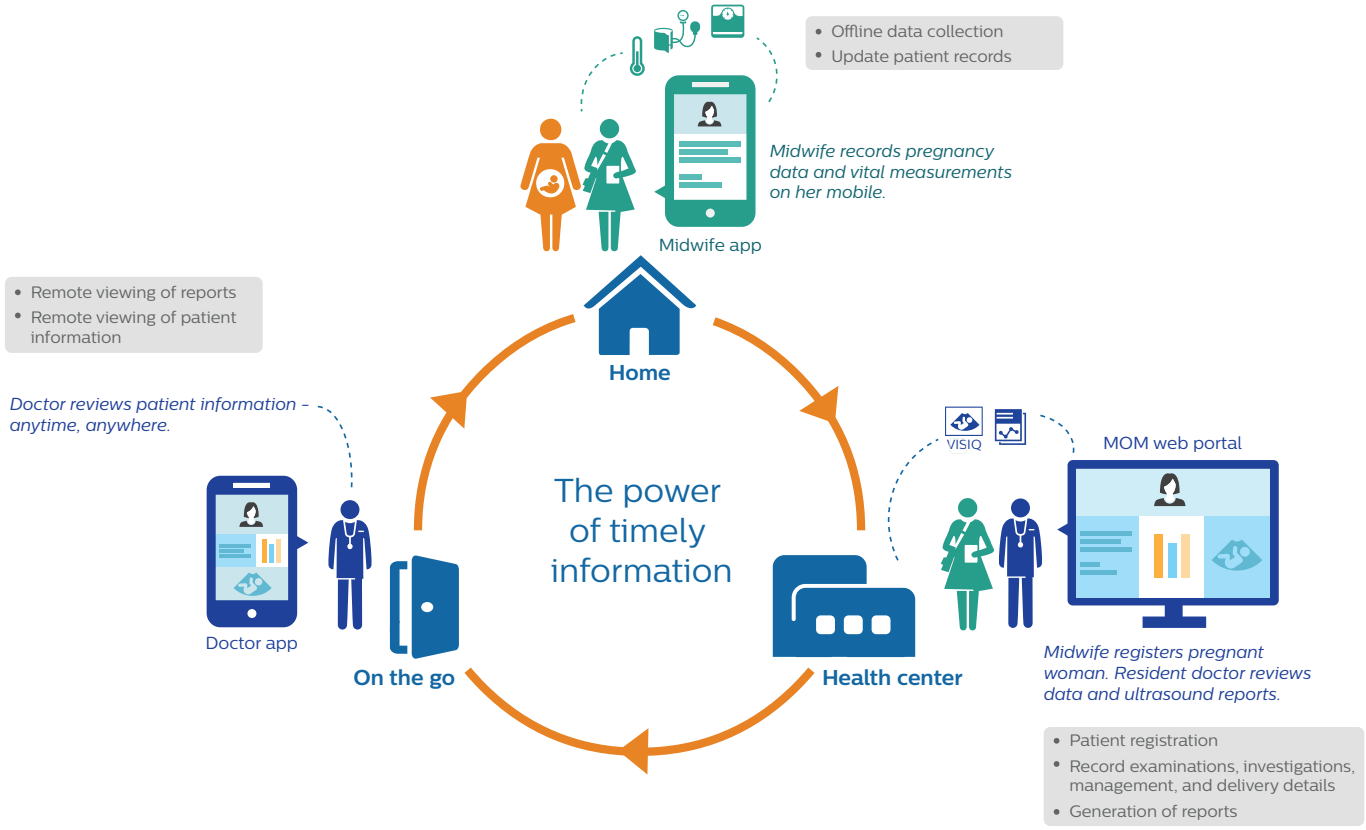
PHILIPS

Mobile Obstetrics Monitoring (MOM)

Maternal monitoring, where and when **it matters**

Providing expectant mothers with enhanced care to address maternal mortality is a top priority for many communities. Philips Mobile Obstetrics Monitoring (MOM) is a software solution that helps unite information and action to identify and manage a high-risk pregnancy by bringing care to where it's urgently needed: primary health centers and patient homes. MOM empowers community caregivers to capture vital information during home visits, enabling antenatal risk stratification, diagnostic assistance, and progress assessment through mobile applications.

The power of **timely information**



MOM software solution includes MOM web app, MOM midwife app, and MOM doctor app.

Connecting home to health center

MOM allows community caregivers and physicians to jointly review and manage each case to provide timely referral of the patient to an appropriate healthcare center for further management if needed.

Enhanced outcomes

Provide early, focused detection and monitoring

- Comprehensive digital patient records allow for early detection of high-risk pregnancies
- Protocol-based care delivery enhances patient outcomes
- Smarter utilization of clinician's time by focusing on high-risk pregnancies

Improved access

Expand access to care

- Facilitates care at patient's home through data collection via midwife app
- Mobile app allows doctor to review patient information on the go
- Encourages institutional deliveries through more proactive patient engagement

Efficient workflow

Enhance patient management

- Digital patient records allow for a paperless workflow
- Easy integration of ultrasound images and other laboratory reports
- One-touch generation of management reports to track progress on key indicators

Convenient dashboard allows clinicians to focus on monitoring high-risk pregnancies.

MOM **unites** information and action

Intuitive workflows make it easy for midwives and clinicians to use MOM to work together to enhance care during a pregnancy.

Midwife enters vitals in the midwife app at patient's home.

Doctor app allows clinicians to review patient information and images on the go.

Key features

Register patients

- General and demographic information
- Medical and obstetrics history

Add examination details

- General examination parameters such as weight and blood pressure
- Obstetrics parameters such as fundal height, fetal presentation, fetal movement
- Complaints including vomiting, pain, swelling, bleeding

Integrate exams and other clinical investigations

- Easy wireless image transfer from Philips VISIQ ultrasound to MOM
- Upload ultrasound images and reports, fetal monitor reports and other laboratory reports in PDF or JPEG format

Enhance management

- Multi-level risk stratification by the midwife and doctor
- Record diagnosis and prescribe medication and nutrient supplements
- Record advice such as follow-up frequency and referral to higher center

Track delivery details

- Delivery outcome, time and mode of delivery
- Print delivery report

Generate management reports

- Report on key statistics such as high-risk pregnancies, number of deliveries and referrals
- Quantify clinical conditions such as HIV, malaria and malnutrition
- View reports at an individual health center level or across multiple sites

Offline data collection via midwife app

- Simple user interface to capture vitals at the patient's home
- Propose pregnancy risk level based on data collected during visit
- Easily update patient data collected offline on midwife app by sending SMS or connecting USB

Review on the go through doctor app

- Remotely view patient information
- Access ultrasound images and other reports outside the traditional care setting

Right **time**, right **place**

Case study MOM pilot in Padang, West Sumatra, Indonesia, 2014*

Key challenge: high MMR

- MMR in Indonesia: 190/100,000 live births
- The **World Health Organization** states that pregnancy-related deaths can be avoided with better access to antenatal care

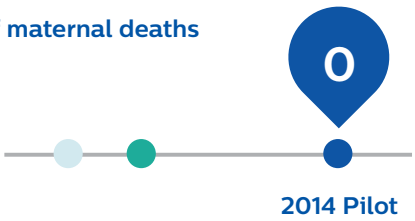
The MOM pilot monitored **656 women for one year** in Padang and delivered positive results; rewarded by **Frost & Sullivan Excellence Award** in 2015.

Key interventions

- MOM software solution
- Antenatal ultrasound
- Team of clinicians to manage care – midwives and doctors
- Careworker kit to capture vitals during home visits

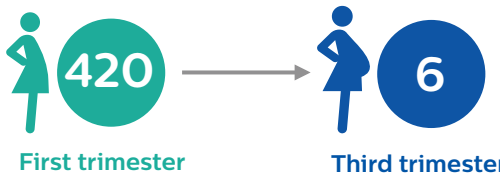
Key results

Number of maternal deaths



Zero maternal deaths during the 2014 pilot thanks to identification, timely referral, and management using the MOM solution.

Patients having mild to severe anemia



99% reduction in anemia from first to third trimester through enhanced patient management.

Detection of very-high-risk pregnancies

3X increase in detection of very-high-risk pregnancies during the pilot.

* Reference MOM Pilot Study White Paper

Technical specifications

Server requirements

- MOM server with following configuration:
  - Processor: Intel i5 Quad Core 3.6 GHz, 64-bit
  - 16 GB RAM DDR3
  - Hard drive: 1 TB
  - 256 GB available hard disk space
  - Ethernet controller gigabit
  - Optical drive DVD+/-RW
  - Windows server 2012 R2 64-bit
  - Browser: Chrome version 40 or Firefox version 35 or above
  - Team Viewer version 9 or above
- UPS (1 KVA) with minimum of two hours of battery backup (recommended)
- 15" monitor with 1280 x 1024 resolution
- Standard keyboard and mouse
- Dongle with activated SIM card

Mobile phone requirements

- Smartphone with activated SIM card (Android version 4.0 or above) for midwife
- USB cables to allow for USB sync by midwife
- Smartphone with HD display (resolution 1280 x 720) and data (Android version 4.0 or above) for doctor

PC requirements

- PC with following specifications:
  - 1 GHz or faster 64-bit (x64) processor
  - 1 GB RAM (recommended 2 GB RAM)
  - Windows 7 Professional 64-bit OS
  - Browser: Chrome version 40 or Firefox version 35 or above
  - DirectX 9 enabled graphics card
- 15" monitor with 1280 x 1024 resolution
- Standard keyboard and mouse

Connectivity requirements

- Internet connectivity speed for MOM server recommended 5 MBPS
- Internet connectivity speed for MOM client recommended 512 KBPS
- Wireless router at health center for VISIQ integration

Complementary components

Ultrasound

Philips VISIQ ultrasound system (recommended)

Community care worker kit

- Blood pressure meter
- Thermometer
- Measuring tape
- Weighing scale
- Fetal Doppler
- Urine protein test kit
- Hemoglobin test kit
- Glucose test kit

VISIQ ultrasound system specifications

1. Introduction

Wherever you need to deliver high quality care, whether in traditional or remote locations, VISIQ is the easy choice. It's ready to go whenever and wherever care takes place.

1.1 Applications

- Abdominal
- Obstetrical
- Gynecological

1.2 Key advantages

- Ultra mobile
- Ultra performance
- Ultra simple

2. System overview

2.1 System architecture

- Next-generation micro-digital broadband beamformer
- Microfine 2D focusing with dynamic focal tuning
- Dynamic range up to 170 dB (full-time input)
- 65,536 digitally processed channels
- SonoCT real-time beam-steered compound imaging
- XRES adaptive image processing
- iSCAN one-touch intelligent optimization for color and pulsed wave (PW) Doppler
- AutoSCAN: no-touch continuous intelligent optimization for 2D
- Gray shades: 256 (8 bits) in 2D, M-mode and Doppler spectral analysis
- Acquisition frame rate: up to 79 frames per second in high frame rate mode (dependent on field of view, depth, and angle)

2.2 Imaging modes

- Philips microfine 2D focusing
- M-mode
- Color flow
- Pulse wave Doppler
- Harmonic imaging
- Intelligent Doppler

2D mode

- SonoCT real-time compound imaging
- XRES adaptive image processing
- Microfine 2D focusing
- AutoSCAN
- Digital reconstructed zoom up to three times with pan capability
- Cineloop image review (up to 1,000 B/W frames)
- 256 (8 bits) discrete gray levels

M-mode

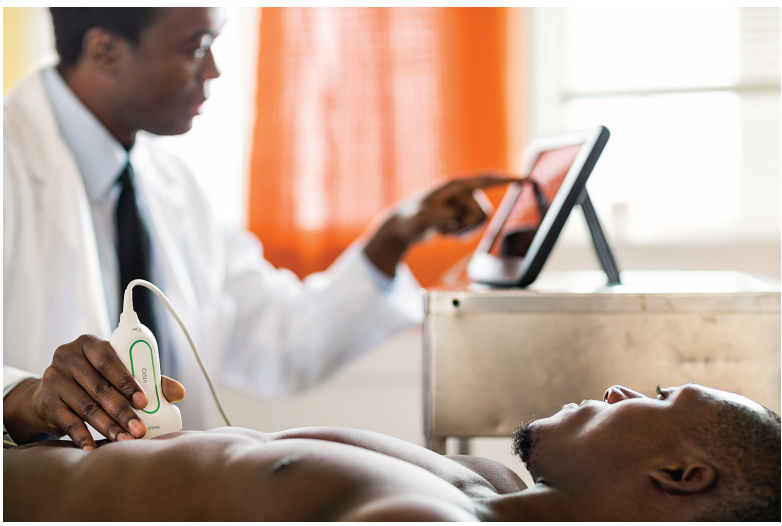
- Selectable sweeping rates
- M-mode review for retrospective analysis of M-mode data
- Cineloop review for retrospective analysis

Color Doppler

- iSCAN optimization automatically adjusts color gain
- Color invert in live and frozen imaging
- Gain 0 to 100 in steps of one
- Cineloop review
- Velocity and variance displays
- Touch-controlled color region of interest: size and position
- Maps, filters, color sensitivity, scale, line density, smoothing, echo write priority, color persistence, gain, and baseline optimized automatically by preset

Pulsed wave Doppler

- iSCAN optimization automatically adjusts scale, baseline and Doppler gain
- Display annotation including Doppler mode, scale (cm/sec), pulse repetition frequency, gain, acoustic output status, and angle correction
- Adjustable scale, frequency, and velocity display ranges
- Selectable sweep speeds
- Doppler review for retrospective analysis of Doppler data
- Frequency range 2-5 MHz



3. System controls

3.1 Optimization controls

SonoCT real-time compound imaging

- High precision beam-steered image compounding acquires additional tissue imaging information compared to orthogonal beams and reduces angle-generated artifacts
- Multiple beam-steered lines of sight
- Operates in conjunction with harmonic and XRES imaging

Harmonic imaging

- System processing of second harmonic frequencies (nonlinear energy) in tissue
- Extends high performance imaging capabilities to most patient body types
- Available in 2D imaging mode
- Image display with reduced artifacts

XRES adaptive image procession

- Enhances images without altering image resolution
- Reduces artifacts, enhances contrast resolution, visibility of tissue texture patterns, and border definition
- Available in 2D, M-mode, zoom, post-freeze, and when capturing loops
- Applied to grayscale data of 2D images

iSCAN intelligent optimization

- In 2D mode: one-button automatic adjustment of TGC and receiver gain to achieve enhanced uniformity and brightness of tissues
- In color Doppler mode: one-button optimization of gain to achieve excellent color sensitivity
- In PW Doppler mode: one-button optimization of spectral tracing to enhance productivity
- Operates in conjunction with SonoCT and XRES imaging

AutoSCAN intelligent optimization

- No-touch continuous intelligent optimization In 2D mode, automatically identifies tissue type and continuously adjusts TGC and receiver gain to achieve tissue uniformity and brightness

VISIQ multi-touch user interface brings you a new ultrasound experience.

3.2 Touchscreen user interface

- Multi-touch user interface
- Alphanumeric QWERTY soft keyboard
- Imaging mode keys: 2D, M-mode, color Doppler, and pulsed wave Doppler (PW)
- 2D image controls: depth, freeze, gain, and focus
- Depth to 30 cm (exam specific)
- Image enhancement controls: harmonic, SonoCT, XRES
- Patient-specific optimization keys: AutoSCAN, iSCAN
- Quantitative controls: caliper, calc, erase, and ellipse
- Doppler or color controls: angle, scale, baseline, gain, and volume
- Image acquisition keys: review, save, and print
- Annotation controls: text, erase, and arrow
- Function keys: start new exam, patient, setup, and end exam

4. Workflow

4.1 Home screen

- Simplified home screen for quick access to all presets, review, and system status
- Four clinical presets
- Power off
- Setup

4.2 Display annotation

- On-screen display of all pertinent imaging parameters for complete documentation, including transducer type and frequency range, active clinical options and optimized presets, display depth, grayscale, color map, frame rate, 2D gain, color gain, color image mode, and hospital and patient demographic data
- Sector width and steering markers
- iSCAN, SonoCT and XRES icons
- Depth to 30 cm (exam specific)
- Real-time display of Mechanical Index (MI)
- Real-time display of Thermal Index (TIb, TIc, TIs)
- Annotation text – places, moves, erases, modifies or appends typed text and arrows
- Annotation erased with start of new study
- End Exam – closes study and returns user to home screen for efficient workflow
- Network connectivity icon to allow immediate feedback about network condition
- Battery status icon and warning to allow immediate feedback about battery condition

4.3 Cineloop review

- Acquisition, storage in memory, and display in real time of up to 1,000 frames of 2D and color images for retrospective review and image selection
- Single frames of Doppler data and M-mode images can be archived to print or electronic media
- Slide control of frame-by-frame image selection
- Functions in 2D and harmonic imaging, M-mode, PW Doppler and color Doppler imaging modes

4.4 Exam documentation

- Peripherals
- Digital B/W and color thermal printer with USB output
- Support of a range of LaserJet printers
- Input and output ports
- Two USB ports on stand; uses include connecting the transducer, supporting data transfer, and supporting qualified printers
- Micro-HDMI video output
- WiFi; uses include DICOM networking and Philips Remote Services*
- Optional Utilization Reports* provide data to help manage ultrasound assets, track usage, and summarize data about exam types, duration, and referrals

4.5 Connectivity

- Two USB ports – uses include connecting the transducer, supporting data transfer, and supporting qualified printers
- Wireless “B and G” networking (WiFi 802.11a/b/g/n) for DICOM image export
- 60 GB hard drive space, 17 GB for patient data storage
- Philips Remote Services connectivity* allows for virtual on-site visits for both clinical and technical support in order to provide fast resolution to issues and questions
- Direct digital storage of single-frame color and B/W images to internal hard disk, USB flash, and USB hard drive
- Direct digital storage of B/W and color loops to internal hard disk, USB flash, and USB hard drive
- Ability to export AVI clips and BMP images to USB flash, and USB hard drive for PC viewing
- Fully integrated interface
- Extensive image management capability, including thumbnail image review
- Study manager allows user to digitally acquire, review, and edit complete patient studies
- Exam directory
- Multiple study archive formats (palette color)
- DICOM 3.1 print and store service-class user
- User may select images to print from all acquired images
- Site-configurable IP address, port, and AE title
- Modality performed procedure step (Mpps)

* Service agreement required for access to Philips Remote Services. Access to the internet required. Not all remote features available in all countries; contact your local Philips representative for details.

5. Transducer

5.1 C5-2 broadband curved array transducer

- User-adjustable focal zone
- Continuous dynamic receive focusing
- 128 elements
- 5 to 2 MHz extended operating frequency range
- 67.5° field of view
- High-resolution imaging for abdominal and Ob/Gyn applications
- Supports 2D, M-mode, color Doppler, PW Doppler and Tissue Harmonic Imaging
- Lightweight USB connector

5.2 Transducer applications

- Abdominal 0-4 cm
- Abdominal 5-10 cm
- Abdominal > 11 cm
- GYN transabdominal < 10 cm
- GYN transabdominal > 11 cm
- OB 1st trimester 10-12 cm
- OB 2nd trimester 12-18 cm
- OB 3rd trimester 15-20 cm
- OB nuchal translucency
- Pediatrics/neonatal abdominal small
- Prostate

C5-2 transducer on the VISIQ supports Ob/Gyn and abdominal requirements.

6. Measurement and analysis

6.1 Measurement tools

- 2D distance
- 2D circumference or area by ellipse
- M-mode distance (depth, time, slope)
- Manual Doppler velocity measurement
- Time and slope measurements in M-mode
- Distance volume
- Fetal heart rate
- Intuitive touch-controlled measurement calipers

6.2 High Q automatic Doppler analysis

- Automatic real-time and retrospective tracing of:
  - Immediate peak velocity (or frequency)
  - Immediate intensity weighted mean velocity (or frequency)
- Doppler values containing PI, RI, S/D indices

6.3 Clinical option analysis packages

Comprehensive measurements, calculations, and application-specific reports with embedded images, including expanded Ob/Gyn and general imaging capabilities for exam documentation

General imaging analysis

- General abdominal
- Small parts (prostate)

Ob/Gyn analysis

- Fetal biometry
- Biophysical profile
- Amniotic fluid index
- Early gestation
- Fetal long bones
- Other OB measurements:
  - 2D echo
  - Fetal heart M-mode
  - Fetal Doppler
- OB calculations and tables
- Gynecology

7. Physical specifications

Physical dimensions of tablet	
Depth	25 mm/.98 in
Height	209 mm/8.2 in
Width	313 mm/12.3 in
Weight	1.2 kg/2.6 lb

Physical dimensions of stand	
Depth	440 mm/17.3 in
Height	1298 mm/51 in
Width	341 mm/13.4 in
Weight	8.9 kg/19.6 lb

High mobility stand

- Easy maneuverability
  - Height adjustable
  - Four-wheel swivel ability
  - Four-wheel lock brake
- Ultra-lightweight stand frame

Display

- 11.6-inch, 1366 x 768 high-resolution LED-backlit display
- When mounted on stand
- Tilt: 0-90°
- Swivel: +/-65°
- Brightness control, automatic backlight stability (BLS) control for quick warm-up and consistent light output over operational life

Localization options

Software

English, French, German, Spanish, Portuguese, Simplified Chinese

Training and user documentation

English, French, German, Indonesian-Bahasa, Portuguese, Simplified Chinese, Spanish

Power requirements

- Power consumed 65 W
- Frequency 50 to 60 Hz
- Voltage 90 to 264 V

Power cords

- Available for electrical standards worldwide

Electrical safety standards

- TUV Rheinland
- IEC 60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance
- IEC 60601-1-2, Collateral Standard, Electromagnetic compatibility – requirements and test
- IEC 60601-2-37, Particular Requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment
- ANSI/AAMI ES60601-1, Medical Electrical Equipment: General requirements for basic safety and essential performance

Electromechanical safety standards (EU only)

- EN60601-2-37, Particular requirements for the basic safety and essential performance of ultrasonic medical diagnostic and monitoring equipment

Agency approvals

- CE Mark in Accordance with the European Medical Device Directive issued by British Standards Institute (BSI)

Environmental

Temperature

- Tablet operating temperature designed to work between 50°F and 95°F (or 10°C to 35°C) at 20-80% relative humidity; lithium-ion batteries are sensitive to high temperatures
- Optional Sony USB printer: 10-40°C at 15-80% relative humidity (non-condensing)

Maintenance

- Optional service agreements to:
  - Contain risk
  - Reduced unscheduled downtime
  - Access Philips best-in-class service

Service

- Philips Remote Services connectivity* allows for many advanced service features, including:
  - Virtual on-site visits for both clinical and technical support in order to provide fast resolution to issues and questions
  - Remote clinical education
  - Remote log file transfer that reduces downtime by allowing fast diagnosis of problems by call center personnel
- On-line support request
  - Simplifies support engagement
  - Provides fast response to clinical questions and technical issues
  - User can enter request directly on the ultrasound system
- Optional Utilization Reports provide data to help manage the site's ultrasound assets*
  - System and transducer usage information
  - Data on number and types of studies, as well as study duration
  - Provides data for staff credentials and accreditation

* Service agreement required for access to Philips Remote Services. Access to the internet required. Not all remote features available in all countries; contact your local Philips representative for details.

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