Developing data-visualisation tools and training of health managers in using real-time information for decision-making in Bangladesh

Dr. Jannatul Ferdous, MD, MPH
3rd November, Stockholm, Sweden
Outline

1. Bangladesh facts
2. DHIS2 and other HMIS software in Bangladesh
3. Data visualisation and public dashboards for decision making
4. Training of health managers and feedback on data quality
5. Implications
6. Challenges and way forward
Bangladesh facts

- 1,47,570 sq km
- 8 divisions, 64 districts, 489 upazilas, 4553 unions
- City corporations: 11; Municipalities: 321
- Total population (2016): 163 million
- Population density per sq.km: 1049
- Per capita GDP (2015): US$ 1358.8
- Global Human Development Index (2015): 139
Pluralistic Health System in Bangladesh
DHIS2 & other software: decision making tools
A nation-wide system for online data collection

- **Super-specialized Hospitals**
- **Tertiary Hospital / Medical College Hospital**
- **District Hospital / Medical College Hospital**
- **Sub-district Hospital**
- **Union Health Center (Day care)**
- **Community Clinic (Day care)**

Bangladesh (Pop. ~150 million)
- Divisions (7) Pop. 23 million
- Districts (64) Pop. 2.5 million
- Sub-districts (483) Pop. 0.3 million
- Unions (4,501) Pop. 35,500
- Wards (13,503) Pop. 12,000

Internet connected April 2009

- About 600 hospitals
- About 19,000 day-care facilities
- About 100,000 health workforce

13,000 community clinics
Data collection in DHIS2 in Bangladesh

- Fully Using DHIS2
- Planned to use DHIS2
- Partially Using DHIS2
- Not yet start DHIS2
Development of Health Data-Warehouse

[Diagram showing the process of data warehouse, with stages: Extract, Transform, Load, and tools like Tableau and CLICDATA]
Innovative development of Public Web Portal


Real time health information dashboard
Directorate General of Health Services, Mohakhali Dhaka, Bangladesh

- BCG COVERAGE 100.4% Last 12 Month : DHIS2
- PNEUMONIA 6.91% Last 12 Mon at facility
- DIARRHEA 11.72% Last 12 Mon at facility
- BIRTH REG RATE 76.98% Last 12 Month : DHIS2

- # of Maternal death notification at community, 2017
- # of Maternal death at public facility, 2017
- # of death due to road traffic injuries, 2017
- # of Suicidal death, 2017
- # of Normal delivery at public facility, 2017

Newborn received CHX(7.1%) at facility, 2017

Infant Mortality Rate (IMR) per 1,000 live births

Source (BDHS)

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Real time Local Health Bulletin for 13,000+ facility

- Health bulletin for sub-district level monitoring
- Health bulletin for district level monitoring
- Health bulletin for divisional level monitoring
Innovation of scoring health facilities for System Strengthening (HSS)

Health systems performance measurement dashboard

**Upazila Health Complex**

1. Kumarkhali Upazila Health Complex
2. Ramganj Upazila Health Complex
3. Sarsa Upazila Health Complex
4. Nawabganj Upazila Health Complex
5. Chowgacha Upazila Health Complex

**District Hospital**

1. Pirojpur District Hospital
2. Bholu District Hospital
3. Jhenaidah District Hospital
4. Lakshmipur District Hospital
5. Barguna District Hospital

**Medical College Hospital**

1. Shaheed Ziaur Rahman Medical College Hospital, Bogra
2. Dhaka Medical College Hospital
3. M Abdur Rahim Medical College Hospital
4. Sylhet MAG Osmani Medical College Hospital
5. Mymensingh Medical College Hospital

**Specialty PG Institute & Hosp**

1. National Institute of Neuro Sciences & Hospital (NINS & H)
2. National Institute of Diseases of the Chest & Hospital (NIDCH)
3. National Institute of ENT
4. Institute of Child and Mother Health, Maturai
5. National Institute of Kidney Disease and Urology

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Dashboards: Newborn status in DHIS2

Percentage of newborn who received postnatal care within two days of birth at facility
Bangladesh

Percentage of newborns initiated breastfeeding within one hour after birth
Bangladesh

Proportion of newborns delivered by SBA at facility not breathe or cry spontaneously for whom resuscitation actions using bag and mask were initiated
Bangladesh

No. of newborns delivered by SDA at facility that received CHX (7.1%) to the cord after birth
No. of newborn received 7.1 Chlorhexidine in the umbilical cord

Percentage of newborns delivered by SDA at facility that received CHX (7.1%) to the cord after birth
Bangladesh

Percentage of newborns delivered by SDA at community that received CHX (7.1%) to the cord after birth
Bangladesh
Dashboards: Health-Workforce

Upazila wise physician distribution from HRM

Summary (Bangladesh)

- **Total Sanctioned**: 10,865
- **Total Available**: 5,437
- **Total Vacant**: 5,099
- **Vacancy (%)**: 48.4
- **RMO Available**: 207
- **UHFPO Available**: 454
- **Jr Consultant Sanctioned**: 2,702
- **Jr Consultant Available**: 1,079
- **Jr Consultant Vacant**: 1,623
- **Jr Consultant Vacancy (%)**: 60.1
- **Jr. Consultant Anesthetist Available**: 179
- **Jr. Consultant Obs-Gyn Available**: 220
- **Grade 9 Doctor Sanctioned**: 7,329
- **Grade 9 Doctor Available**: 3,886

Legend:
- 0-20%
- 20-50%
- 50-100%

District Name:
- All
- Barisal
- Chittagong
- Dhaka
- Khulna
- Mymensingh
- Rajshahi
- Rangpur
- Sylhet

Upazila Name set:
- All
- Abhaynegor
- Azampur
- Agailpara
- Akhaura
- Kulpur

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## Dashboards: Biometric Attendance System

### Real time health information dashboard
Directorate General of Health Services, Mohakhali Dhaka, Bangladesh

### Attendance Summary
Some staffs work in roster. They might be available later.

<table>
<thead>
<tr>
<th>Reporting Period</th>
<th>Search</th>
<th>last updated at</th>
</tr>
</thead>
<tbody>
<tr>
<td>10/26/2017</td>
<td></td>
<td>October 26, 2017 10:10:10 am</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>S1</th>
<th>Division</th>
<th>Orgs. with functioning attendance system</th>
<th>Orgs. sending data</th>
<th>No. of Posts</th>
<th>No. of staffs</th>
<th>Attendance (%)</th>
<th>View</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Sanctioned</td>
<td>Filled</td>
<td>Vacant</td>
<td>Rgd. in attendance system</td>
</tr>
<tr>
<td>1</td>
<td>Barisal</td>
<td>40</td>
<td>28</td>
<td>5,756</td>
<td>4,041</td>
<td>1,715</td>
<td>29.79</td>
</tr>
<tr>
<td>2</td>
<td>Chittagong</td>
<td>94</td>
<td>36</td>
<td>14,128</td>
<td>9,627</td>
<td>4,501</td>
<td>31.86</td>
</tr>
<tr>
<td>3</td>
<td>Dhaka</td>
<td>91</td>
<td>59</td>
<td>22,573</td>
<td>17,668</td>
<td>4,905</td>
<td>21.73</td>
</tr>
<tr>
<td>4</td>
<td>Khulna</td>
<td>60</td>
<td>47</td>
<td>8,947</td>
<td>6,116</td>
<td>2,831</td>
<td>31.64</td>
</tr>
<tr>
<td>5</td>
<td>Mymensingh</td>
<td>33</td>
<td>21</td>
<td>5,061</td>
<td>3,653</td>
<td>1,408</td>
<td>27.82</td>
</tr>
<tr>
<td>6</td>
<td>Rajshahi</td>
<td>64</td>
<td>28</td>
<td>9,495</td>
<td>6,940</td>
<td>2,555</td>
<td>26.91</td>
</tr>
<tr>
<td>7</td>
<td>Rangpur</td>
<td>58</td>
<td>25</td>
<td>7,675</td>
<td>5,532</td>
<td>2,143</td>
<td>27.92</td>
</tr>
<tr>
<td>8</td>
<td>Sylhet</td>
<td>36</td>
<td>19</td>
<td>5,009</td>
<td>3,138</td>
<td>1,871</td>
<td>37.35</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>476</td>
<td>263</td>
<td>78,644</td>
<td>56,715</td>
<td>21,929</td>
<td>27.88</td>
</tr>
</tbody>
</table>

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Dashboards: Complain and suggestion system by citizen

- Water & sanitation: 20.8% (2017)
- Attitude & behavior: 3.28%
- Punctuality: 0.26%
- Poor maintenance: 16.76%
- Personal privacy: 0.91%
- Corrupt & transparency: 1.86%
- Negligence to responsibility: 11.51%
- Comments of good performance: 16.94%
- Complainer is not available: 11.62%
- Other: 26.45%

Complain Source
- (All)
- MIS, DGHS (SMS Based)
- Shashto Batayon (16263)...

Complain Year
- (All)
- 2012
- 2013
- 2014
- 2015
- 2016
- 2017

Complain Type Name
- Attitude & behavior
- Comments of good performance
- Complainer is not available
- Corruption & transparency
- Equity & discrimination
- Food quality
- Personal privacy
- Poor maintenance
- Punctuality
- Responsibility
- Service
- Water & sanitation

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Dashboard: 24/7 call center: 16263

Real time health information dashboard  Directorate General of Health Services, Mohakhali Dhaka, Bangladesh

Shastho Batayon (16263)  from Call Center

Total Saysth Batayon Information (Click + sign to drill)  Saysth Batayon Information compare month wise

<table>
<thead>
<tr>
<th>Month of</th>
<th>Batayon Date</th>
<th>No. of Doctor Consultancy</th>
</tr>
</thead>
<tbody>
<tr>
<td>October</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>2,410</td>
<td>1,628</td>
</tr>
<tr>
<td></td>
<td>2,219</td>
<td>2,078</td>
</tr>
<tr>
<td></td>
<td>2,079</td>
<td>2,000</td>
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<tr>
<td></td>
<td>2,128</td>
<td>1,734</td>
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<tr>
<td></td>
<td>2,000</td>
<td>1,641</td>
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<tr>
<td></td>
<td>1,901</td>
<td>1,868</td>
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<tr>
<td></td>
<td>1,797</td>
<td>2,040</td>
</tr>
<tr>
<td></td>
<td>1,856</td>
<td>1,927</td>
</tr>
<tr>
<td></td>
<td>1,825</td>
<td>1,788</td>
</tr>
<tr>
<td>September</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>3,900</td>
<td>2,773</td>
</tr>
<tr>
<td></td>
<td>3,932</td>
<td>3,373</td>
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<tr>
<td></td>
<td>3,198</td>
<td>2,931</td>
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<td></td>
<td>3,062</td>
<td>3,411</td>
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<td></td>
<td>3,157</td>
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<td>3,086</td>
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<td>3,109</td>
<td>2,872</td>
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<td></td>
<td>2,963</td>
<td>2,823</td>
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<td>2,536</td>
<td>2,184</td>
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<td></td>
<td>2,170</td>
<td>1,991</td>
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<tr>
<td></td>
<td>2,041</td>
<td>2,232</td>
</tr>
<tr>
<td></td>
<td>2,228</td>
<td></td>
</tr>
</tbody>
</table>

Measure Names
- No. of Ambulance Information
- No. of Call Received
- No. of Complaints
- No. of Doctor Consultancy
- No. of Health Information
- No. of call to know about the

Year of Batayon Date
- (All)
- 2016
- 2017

Month
Emergency Preparedness management by DHIS2

Trend Analysis: No. of affected


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Status report of Rohingya influx from Myanmar in Cox's Bazar

Unregistered Rohingya Myanmar Nationals in Bangladesh
Health situation & Interventions Update
Date: 02 November 2017

603,000
Total new influx Since 25 August 2017

40% in 3 settlements
Balukhali, Leda & Kutupalong makeshift settlements

<table>
<thead>
<tr>
<th>Health Interventions</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>MR Vaccine</td>
<td>135,519</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Polio Vaccine</td>
<td>72,334</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Vitamin A</td>
<td>72,064</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Oral Cholera Vaccine</td>
<td>700,487</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>SAM</td>
<td>4,079</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MAM</td>
<td>9,628</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>No. of population aged 1 to 15 year received</th>
<th>No. of U5 children received</th>
<th>No. of U5 children received</th>
<th>1 years and above</th>
<th>Reported from medical camp</th>
<th>Reported from medical camp</th>
</tr>
</thead>
<tbody>
<tr>
<td>135,519</td>
<td>72,334</td>
<td>72,064</td>
<td>700,487</td>
<td>4,079</td>
<td>9,628</td>
</tr>
</tbody>
</table>

Cumulative number of medical consultations given for different diseases

<table>
<thead>
<tr>
<th>Diseases</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Diarrhoea</td>
<td>44,586</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RTI</td>
<td>62,978</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injury</td>
<td>6,435</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Skin Infection</td>
<td>26,194</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>ANC</td>
<td>6,383</td>
<td></td>
<td></td>
<td></td>
<td></td>
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</tr>
<tr>
<td>PNC</td>
<td>659</td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
</tbody>
</table>

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Support to develop DHIS2 e-Learning platform

What is DHIS2?
DHIS 2 is a tool for collection, validation, analysis, and presentation of aggregate statistical data, tailored (but not limited) to integrated health information management activities. It is a generic tool rather than a pre-configured database application, with an open meta-data model and a flexible user interface that allows the user to design the contents of a specific information system without the need for programming. DHIS2 is a modular web-based software package built with free and open source Java frameworks with interoperability between users and programs.
Capacity strengthening of Health Managers, Statisticians and IT focal for evidence use

- More than 700 personnel in last two years
- Monthly review meeting: divisional, District, and sub-district
- National Weekly meeting with Line directors through Skype calls
Data visualization: how it helps managers

It is possible for health manager to examine

- Completeness of data
- Accuracy of data
- Monitor OP indicators
- Track own performances
- Find bottleneck
- Compare facilities
- Immediate action
Data for action

LD's Dashboard
Divisional Dashboard
District Dashboard
Upazila Dashboard

Drill down
Drill down
Drill down

Director's Office
Monthly Meeting

Chittagong
Divisional Director Office
Monthly Meeting

Civil Surgeon Office
Rangamati
Monthly Meeting

UH&FPO Kawkhali
Monthly Meeting
Immediate outcomes

- Dashboards improves accountability of health leaders for data-driven decision making

- Local Health Bulletin enhances review of program activities using data

- Online scoring of Health Facilities enhances competition to improve services

- Training of Health Managers on data analysis and use of information improved data quality

- Rate of reporting improved from 60% to 95% in the last two years

- Regular analysis and feedback improved completeness and accuracy of data in the last two years
**DGHS is on way to SDG monitoring**

**Real time health information dashboard**  Directorate General of Health Services, Mohakhali Dhaka, Bangladesh

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**Status of SDG health indicators - Bangladesh**

Bangladesh has initiated real time monitoring system for health related SDG indicators. This dashboard visualizes both survey and routine health data from more than 14,000 public health facilities in Bangladesh.

1. **3.1 Maternal Mortality**
   - **MMR**: 158

2. **3.2 Newborn and child mortality**

3. **3.3 Communicable diseases**

4. **3.4 Noncommunicable diseases and mental health**
   - **NCD Death**: 4009

5. **3.5 Substance abuse**

6. **3.6 Road traffic injuries**
   - **Road Injury**: 300

7. **3.7 Sexual and reproductive health**

8. **3.8 Universal health coverage**

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However, challenges still remain

- **Culture of data** use by health managers and doctors are still poor

- **Lack of staff** (stop-gap management)

- **Cost** to replacing and buying tablets, laptops and computers and **pay** for internet connection

- **Weak supervision and M&E systems**

- **Fragmented data storage system** by different institutions (DGHS & DGFP)
Recommendations

- Ongoing capacity development activities should be continuing in upcoming sector plan
- Basic statisticians need to be recruited
- Additional HR training to support statistician (Sr. staff nurse)
- Establishing accountability through reward, recognition & punishment
- Develop new module for covering all health programs including Health Financing tracking
- There is need for change of mind set-up and change of culture particularly for top managers
This project has been funded by European Union (EU) at icddr,b as SHARE project (Strengthening Health Applying Research Evidence).

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