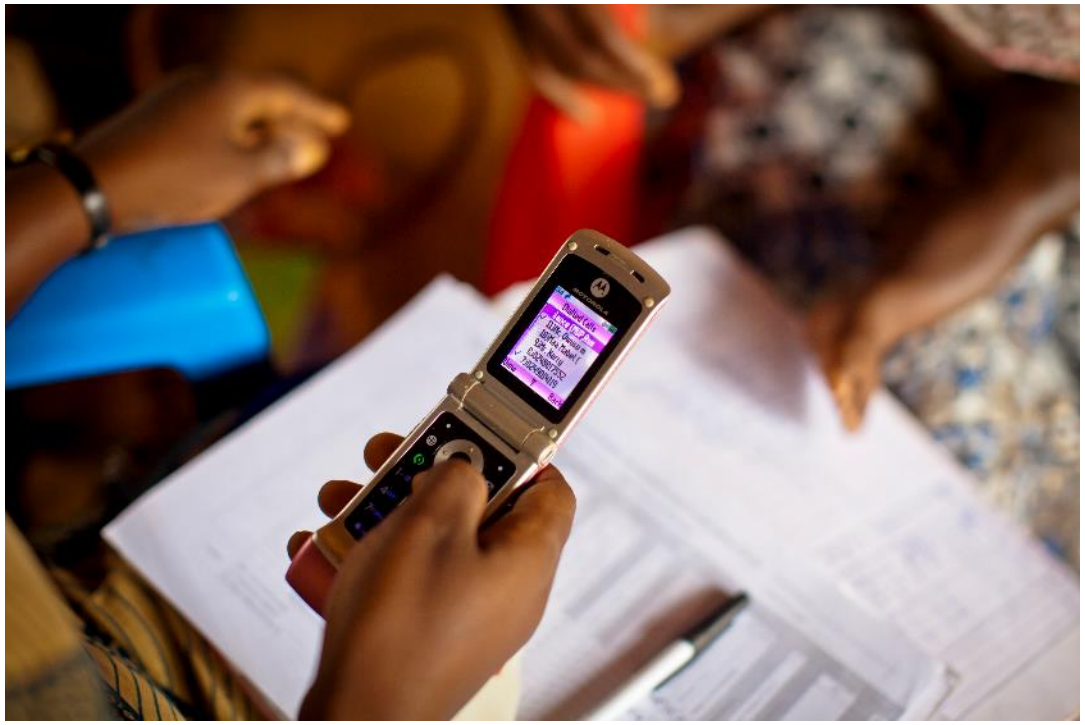
The Power of Data Aggregation and Visualization Tools for Improved Decision Making



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Introduction

- The primary purpose for collecting data through either the routine health information system or surveys is to provide data that enhance decision-making in the delivery of health services.

- Ensuring access to a comprehensive high quality data quality is key in the process of supporting evidence-based decision making at all levels.

Introduction

- Data is often collected as variables in registers or primary data collection tools and might come from either the routine health information system, facility surveys or community surveys.

- The individual level data might either be collected through a paper-based system or an electronic system.

- It is virtually impossible to make any meaningful use of data in this format.

Aggregating Data

- The data thus collected must be aggregated according to a defined format depending on what is needed from the data e.g. average of individual ages can be calculated by adding up all the ages and dividing by the total numbers registered.

- From the aggregate, indicators can be calculated, then use to produce information which can then be used to inform service decision making.

Aggregating Data

- Standardized approach of aggregating these variables by pre-defined programme needs to facilitate the collection and use of the data.

- This can be done through paper-based aggregating tools – e.g. tally sheets and summary sheets.

- This manual aggregating tools increases the potential for errors and compromises data quality.

Aggregating Data

- Electronic means of aggregating data using various softwares improves the quality of the data generated and facilitates sharing of the data with others.

- The aggregated data can be presented as percentages, proportions, ratios, means, mode median etc.

- The usefulness of these aggregated data for decision-making depends largely on the skill of the person to make sense out of this aggregated data.

Aggregate data

Organisation unit	VARIABLE A- Uncomplicated Malaria suspected	VARIABBLE B- Uncomplicated Malaria Suspected Tested	CALCULATED- C INDICATOR- Percentage Tested
Ashanti	1034038	589980	57.1
Brong Ahafo	1233153	821896	66.6
Central	571284	364190	63.7
Eastern	772850	564007	73.0
Greater Accra	624179	368246	59.0
Northern	625712	223351	35.7
Upper East	610823	492621	80.6
Upper West	432075	350104	81.0
Volta	562338	306849	54.6
Western	960783	531255	55.3

- The aggregated variables A and B is difficult to understand and use
- The generated indicator C conveys some meaning to people with program knowledge and understanding.
- Figures even when aggregated and used to generate indicators by themselves are difficult to appreciate for a lot of people.

Example: Neonatal Deaths

- Burden of neonatal deaths, evident in routine data as unacceptably high, remained undetected for years because of late submissions and incompleteness of reports.

- It took the Demographic and Health Survey (2008) to make this national crisis evident

Demographic and Health Survey 2008

Table 15 Trends in early childhood mortality rates

Infant and under-five mortality, Ghana, 1983-2008

Survey year	Approximate calendar period	Infant mortality ($_1q_0$)	Under-five mortality ($_5q_0$)
1988	1983-1987	77	155
1993	1989-1993	66	119
1998	1994-1998	57	108
2003	1999-2003	64	111
2008	2004-2008	50	80

Visualizing

- Visualizing the data enhance its understanding and use by a larger group of people.

- There are various approaches to generate these visualization.

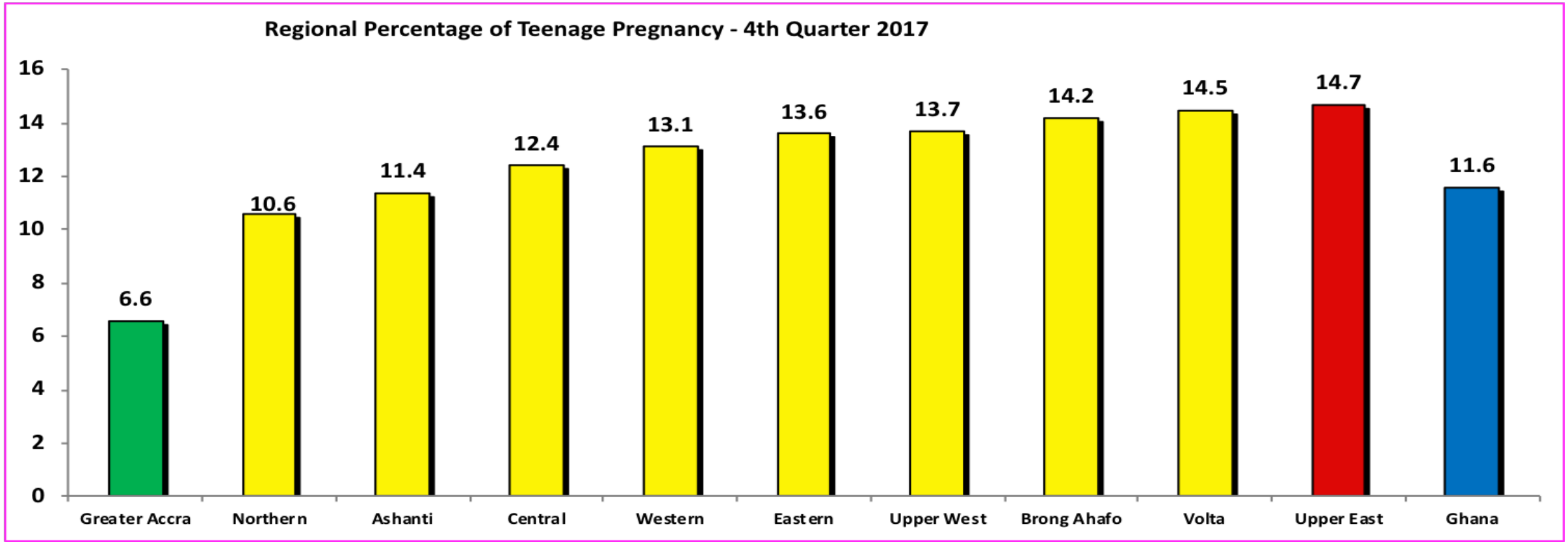
- It can be done manually by drawing graphs of various types, marking on predefined charts or using electronic data visualization tools present in a lot of software

Visualizing

- Data visualizations in Ghana are curated differently depending on the target audience.
- At the lowest facility levels – hand drawn graphs are used to visualize the data.
- Immunization charts are used to follow up on for example drop-outs and ensure that targets for EPI are achieved.
- At the facility level, graphs and charts showing performance are displayed on notice boards.

Visualizing

- Microsoft Excel drawn graphs have been used to give better understanding of the service data and promote its use for service decision-making-
- From this graph it is clear that UER has a high teenage pregnancy compared to GAR. Questions can then be asked as to what is contributing to the difference that is being seen



Visualizing

- For busy senior managers within the Ghana health system, targeted DHIS2 dashboards are developed to address the particular needs and interests of individuals, who rarely have the time to complete their own analysis.

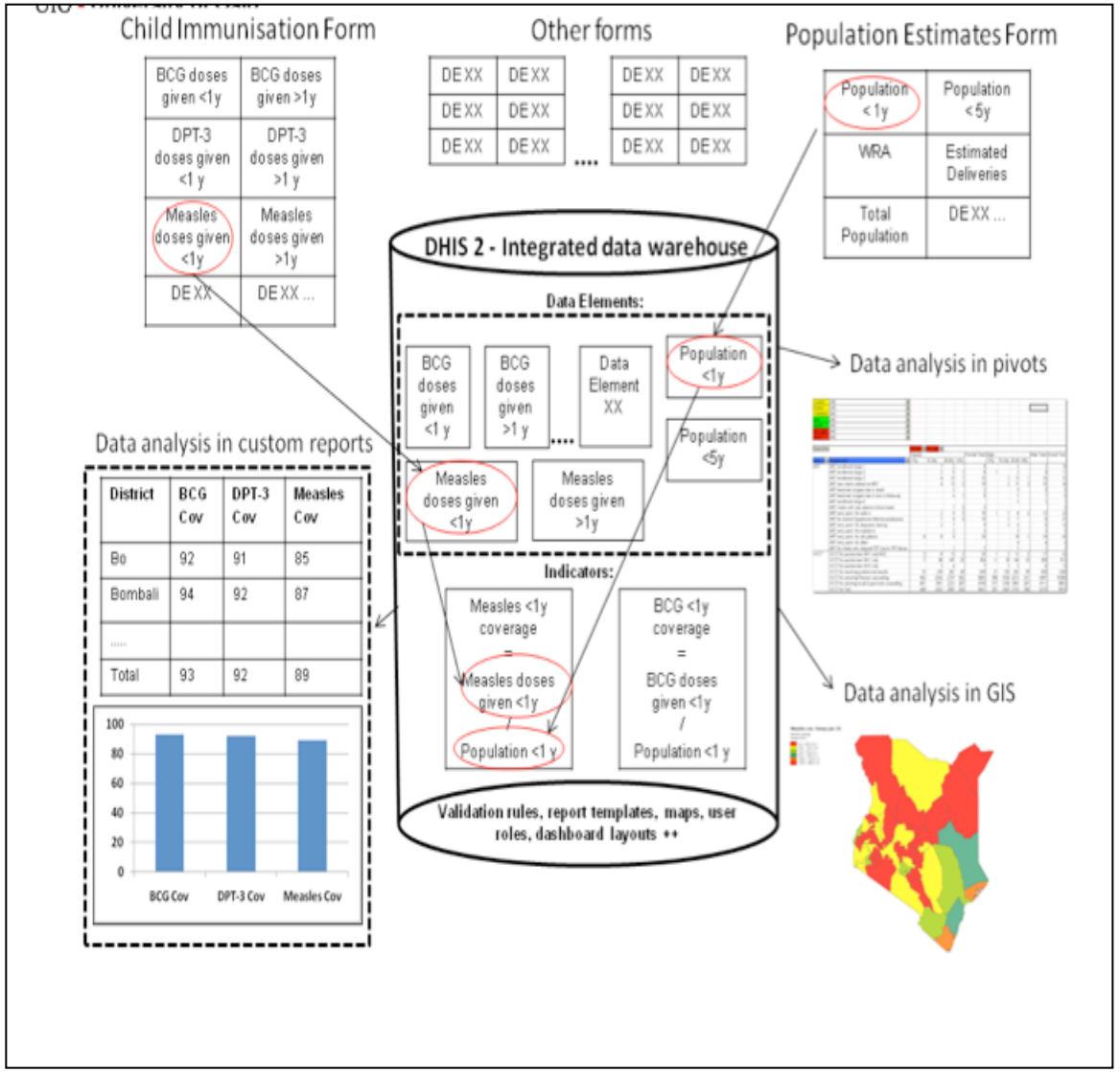
- These dashboards include both technical and contextual information that managers need to make evidence-based decisions

Solution- using Ghana as an example

- DHIMS2 has data entry alternatives that can be customized to replicate paper forms – to simplify the process of data entry

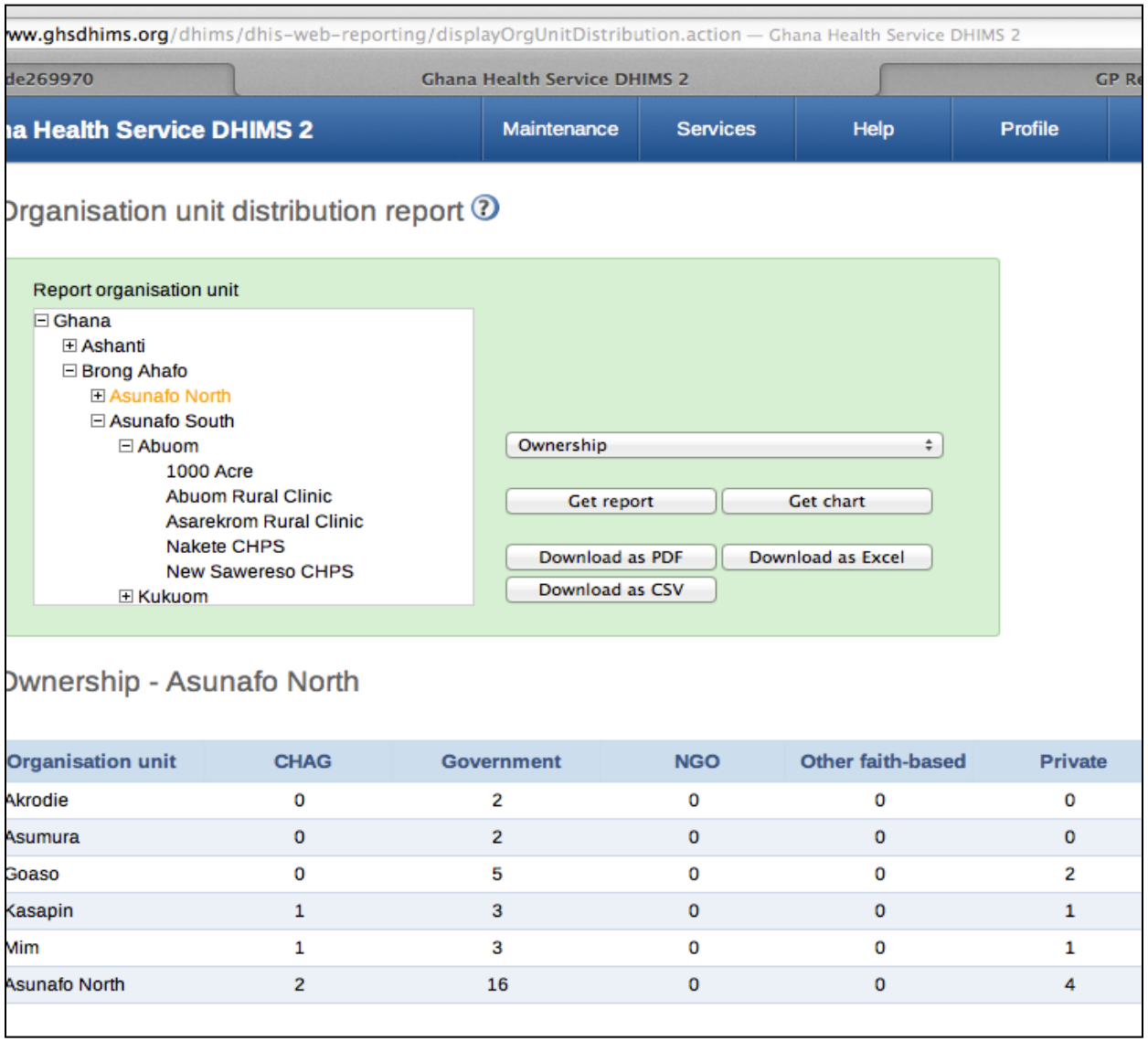
- Data Aggregation and Visualization Tools for Improved Decision Making

- Dashboard for monitoring and evaluation of health programs that can also be user-customized to allow different indicators to be generated and analysed for linking specific health outcomes, with the added functionality of, carrying out data quality analysis

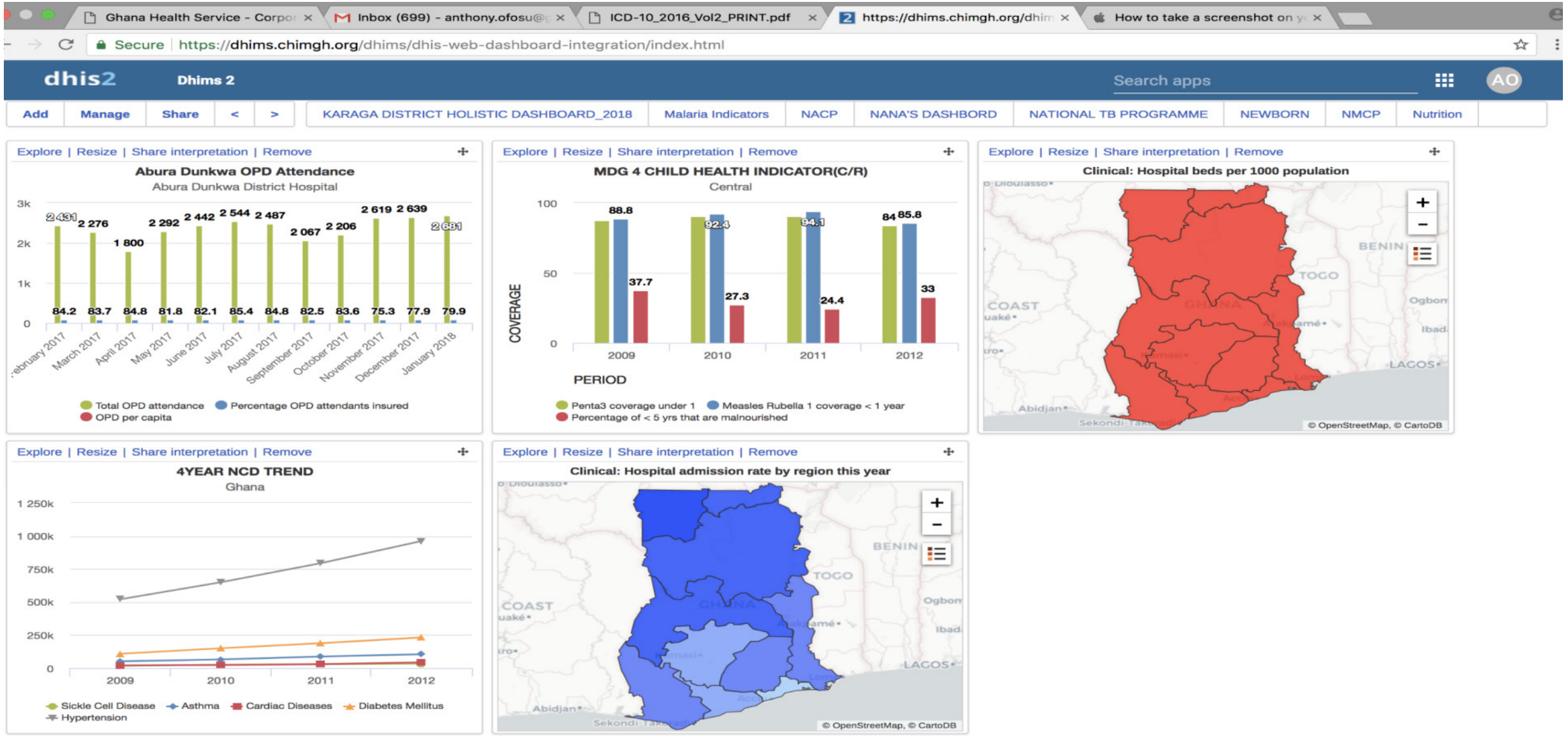


ICT Solution

- This is based on 3 fundamental premises:
  - knowing what one is looking for (whether data element or indicator)
  - where one requires this data or information from (location- regional, district, sub-district or facility level)
  - and when (period or point) time reference.



DHIS2 (DHIMS2) Dashboard



Visualizing

- In 2014, the Ghana Health Service Team was trained on the ALMA RMNCAH scorecard monitoring tool as a means to track progress across the country using internationally comparable indicators.

- The ALMA score card has been implemented for advocacy purposes, utilizing easy to understand color coding and focusing on internationally comparable indicators.

- It shows the performance of regions and districts using colour codes and arrows. At a glance regional and district performance can be easily assessed

ALMA RMNCAH Score Card

National Priorities

Not on track

Maternal Mortality Ratio	Neonatal Mortality Rate	Infant Mortality rate	Under 5s Mortality rate	Proportion of children under 5 who are stunted	Exclusive breastfeeding	CPR	Total CYP
319	29	41	60	⬆19%	52%	23%	⬆2,757,789

Scorecard

Region	Reproductive Health	Maternal Health							Newborn Heal	
Region	Acceptor Rate	Tetanus Diptheria coverage	% adolescents (10–19 yrs) ANC registrants	ANC 4th visit	% pregnant women with anemia at 36w	IPT 3 Coverage	% Skilled delivery	Institutional Maternal Mortality Ratio	Still birth rate	Fresh still birth
▾Ghana	8%	64%	1%	77%	31%	45%	82%	⬆144	0%	⬆0.0
▸Ashanti	5%	⬇55%	0%	72%	31%	40%	78%	⬇122	0%	⬆0.0
▸Brong-Ahafo	15%	76%	1%	⬆86%	24%	59%	⬇85%	⬆86	0%	⬆0.0
▸Central	7%	⬇59%	0%	74%	32%	52%	93%	⬇173	0%	⬆0.0
▸Eastern	7%	⬇60%	2%	70%	28%	48%	71%	⬆204	0%	⬆0.0
▸Greater Accra	13%	69%	1%	91%	⬇32%	49%	85%	⬆180	0%	⬆0.0
▸Northern	5%	96%	0%	73%	38%	⬆34%	91%	⬆162	0%	⬆0.0
▸Upper East	7%	58%	1%	⬇78%	40%	42%	95%	⬆145	0%	⬆0.0
▸Upper West	13%	61%	4%	⬆91%	⬇47%	49%	99%	⬇143	0%	⬆0.0
▸Volta	8%	⬇52%	1%	72%	31%	45%	68%	⬆107	0%	⬆0.0
▸Western	6%	⬇51%	0%	74%	27%	40%	77%	⬆100	0%	⬆0.0
Source:	DHIMS2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2	DHIMS 2

Institutional Neonatal Mortality Rate

Definition

Proportion of institutional neonatal deaths for every 1,000 live births

Source

DHMIS 2

Numerator

Total neonatal deaths in a specified period

Denominator

Total number of live births in the specific period.

Red to Yellow

6

Yellow to Green

5

Reporting frequency

Quarterly

Using Data aggregation and visualization tools as feedback to regions and districts for improved decision making

PERFORMANCE FEEDBACK TO THE REGIONAL HEALTH DIRECTORATES & GHS DIVISIONS

dhis2

HALF YEAR 2017

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INTRODUCTION

This **Half Year 2017 Feedback** highlights best and least performing regions with respect to key service indicators from dhims2.[1] A **'League of Regional Performance'**[2] is illustrated for each indicator. A **'Performance Gauge'** (PG) depicted below shows regional performance based on a grading system **(A⁺ - E)** for selected indicators. **'Evidence-based interventions'** that appropriately implemented lead to optimal achievement for each service indicator are stated. The feedback ends with a **'League Table of the Overall Regional Performance'** for the respective review period.

Regions are to employ this feedback to assess their performance with respect to national or regional specific targets for indicators. Additionally, regions are to continue provision of similar regular feedback to Districts on their performance. Qualitative analysis and peer-review of performance at all levels that reveals the **'Why/How'** of performance and timely information dissemination that facilitates decision making should be rigorously pursued.

Performance Gauge (PG)

Indicator

Best Range on PG Scale	...	...	...	...	Least Rangeon PG Scale
A⁺ Extremely Excellent	A Excellent	B Very Good	C Good	D Satisfactory	E Unsatisfactory
Region(s)	Region(s)	Region(s)	Region(s)	Region(s)	Region(s)

[1] DHIMS2 data for the feedback period is downloaded between the **26th** of the **ensuing month** and **its ending.**

[2] League of Regional Performance for each indicator has **'columns/bars'** of Best and Least performing Regions 'shape-filled' Green and Red respectively and Blue for the National performance.

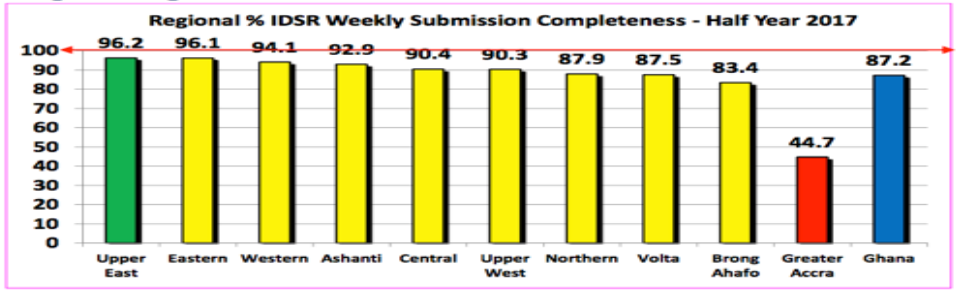
9.0 INTEGRATED DISEASE SURVEILLANCE AND RESPONSE

(Communicable, Non-Communicable Diseases and other Health Related Events)

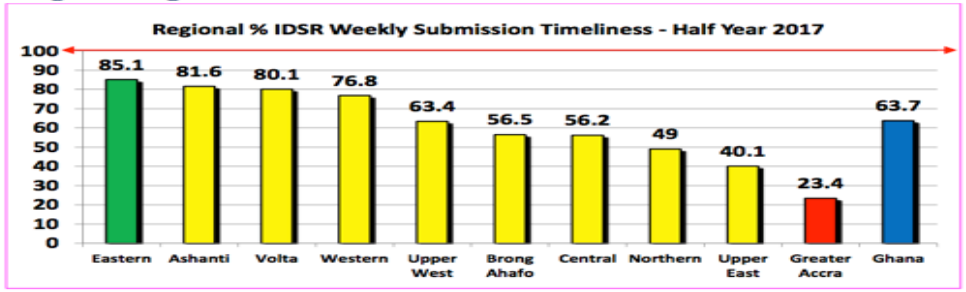
IDSR WEEKLY SUBMISSION

REGION	IDSR Weekly - Completeness	IDSR Weekly-Timeliness
National Target	100%	100%
National Achievement	87.2%	63.7%
Best Performing	Upper East: 96.2%	Eastern: 85.1%
Least Performing	Greater Accra: 44.7%	Greater Accra: 23.4%

League of Regional Performance



League of Regional Performance



Conclusion

- When routine health service data is visible, easily available and accessible on a common platform for all managers
  - ❑ There are constructive critiques on what the *typical trends of specific indicators should look like* versus *what anomalies are being recorded to prompt further inquiry*.
- This leads to continuous discussions on how to improve upon
  - Reporting rates
  - Data completeness
  - Accuracy
  - Internal consistencies of the routine health service data.
- This also helps to draw the true pattern of service utilization against the knowledge of the interventions that are being put into the health care service delivery system across the various districts

Thank you