# Chapter 3 Diagnostic Services

Efficient and effective diagnostic services, both radiological and pathological, are amongst the most essential health care facilities for delivering quality treatment to the public based on accurate diagnosis.

Audit observed that many of the significant radiology and pathology tests were not being carried out in the six test-checked DHs due to lack of required equipment and skilled manpower. Significant audit findings in this regard are discussed in the succeeding paragraphs:

## 3.1 Radiology Services

The role of radiology is central to disease management for detection, staging and treatment of diseases. Adequate availability of functional radiology equipment, skilled man-power and consumables are the key requirements for the delivery of quality radiology services.

### 3.1.1 Availability of radiological equipment

Indian Public Health Standards (IPHS), 2012 prescribed various types of radiological equipment (X-ray machines, Ultrasonography and CT scan) for District Hospitals (DHs) as shown in **Table 3.1**.

**Table 3.1: Requirement of various types of radiological equipment in DHs**

| Sl. No. | Name of the equipment | Number of equipment required as per IPHS norms | Number of equipment required as per IPHS norms |
|---|---|---|---|
| | | 101-200 Bedded | 201-300 Bedded |
| 1 | 500 milli Ampere (mA) X-ray machine* | 1 Desirable | 1 |
| 2 | 300 (mA) X-ray machine | 1 | 1 |
| 3 | 100 (mA) X-ray machine | 1 | 1 |
| 4 | 60 (mA) mobile X-ray machine | 1 Desirable | 1 |
| 5 | Dental X-ray machine | 1 | 1 |
| 6 | Color Doppler Ultrasound machine (Obstetrics and Gynecology departments should have separate ultra-sound machine) | 1 + 1 | 2 + 1 |
| 7 | C.T. Scan[14] multi slice | 1 Desirable | 1 Desirable |

* To be provided as per need

The position of availability of radiological equipment in the six test-checked DHs during 2014-19 is given in **Table 3.2**.

[14] Desired for hospitals having bed strength of more than 100 beds.

**Table 3.2: Availability of various types of radiological equipment**

| Name of district hospital | No. of sanctioned Beds | Name of Radiological equipment | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | X-ray (in mA) | | | | Dental X-ray | USG | CT scan |
| | | 100 | 300 | 500 | 60 | | | |
| Ramgarh | 100 | 01 | Nil | Nil | Nil | 01 | Nil | Nil |
| Deoghar | 100 | 01 | 01 | Nil | Nil | Nil | 01 | Nil |
| East Singhbhum | 100 | Nil | 01 | Nil | Nil | 01 | 01 | Nil |
| Palamu | 200 | 02 | Nil | Nil | Nil | 01 | 01 | 01 |
| Ranchi | 200 | 01 | Nil | 01 | Nil | 01 | 01 | Nil |
| Hazaribag | 250 | Nil | 02 | Nil | Nil | 01 | Nil | Nil |

***(Source: Test-Checked DHs)***

As shown in **Table 3.2**, two test-checked DHs did not have Ultrasonography (USG) machine while Computed Tomography (CT) scan machines were not available in five out of the six test-checked DHs. Prescribed X-ray machines were available only in DH Deoghar. Audit further observed that Dosimeter[15], an x-ray room accessory used to measure radiation exposure, was not available in any of the test-checked DHs. Further, even though dental X-ray machine was available in DH, Ranchi since 2017, it could not be installed as of March 2020 due to shortage of space and non-availability of Radiologist and Technician.

Audit further observed that X-ray machines of higher radiation and penetration levels (300 and 500 mA) were being used in three DHs (East Singhbhum, Hazaribag and Ranchi) instead of X-ray machines of lower radiation and penetration (100 and 300 mA) as prescribed by the World Health Organisation. As a result, risk of patients being unnecessarily exposed to adverse effects of higher radiations cannot be ruled out.

Thus, access of patients to evidence-based treatment facilities and quality health care was limited due to non-provision of all kinds of radiology services in the test-checked DHs.

The Department accepted (January 2021) the necessity of X-ray machines in two DHs (East Singhbhum and Hazaribag) but was silent in respect of other DHs. The reply was also silent on other shortcomings pointed out by Audit.

### 3.1.2 AERB license for radiology machines

As per Atomic Energy (Radiation Protection) Rules, 2004, a license from the Atomic Energy Regulatory Board (AERB) is necessary for establishing X-ray and CT scan units.

Audit observed that test-checked DHs did not have AERB license for operating X-ray units during 2014-19. DH, East Singhbhum had, however, obtained the license in October 2019. Test-checked DHs did not explain the reasons behind operating X-ray units without required license which was

[15] Dosimeter- measures exposure to ionising radiation over a given period

needed to ensure the safety of patients and medical staff *vis-à-vis* potential exposure to excess radiation.

The Department accepted (January 2021) the facts and stated that DHs East Singhbhum and Ranchi had obtained the licenses during 2019-20.

## 3.2 Pathology services

Pathology services are the backbone of any hospital for extending evidence-based health care to the public. As in the case of radiology services, availability of essential equipment, reagents and human resources are the main drivers for the delivery of quality pathology services through in-house laboratories.

### 3.2.1 Availability of pathology services

IPHS prescribes 70 types of pathological investigations under five categories[16] to be carried out in the district-level hospitals.

Audit noticed that the full range of pathological investigations were not available in-house in the six test-checked DHs as shown in **Table 3.3**.

**Table 3.3: Non-Availability of pathological services as on 31 March 2019**

| Pathology tests | | Number of pathological tests not available in DHs (Shortfall in *per cent*) | | | | | |
|---|---|---|---|---|---|---|---|
| Name | Numbers of tests required | Deoghar | East Singhbhum | Hazaribag | Palamu | Ramgarh | Ranchi |
| Clinical pathology | 29 | 16 (55) | 20 (69) | 15 (52) | 18 (62) | 15 (52) | 03 (10) |
| Pathology | 8 | 06 (75) | 08 (100) | 08 (100) | 08 (100) | 07 (83) | 02 (25) |
| Microbiology | 7 | 07 (100) | 07 (100) | 07 (100) | 07 (100) | 07 (100) | 06 (86) |
| Serology | 7 | 04 (57) | 04 (57) | 02 (29) | 05 (71) | 05 (71) | 02 (29) |
| Biochemistry | 19 | 13 (68) | 12 (63) | 14 (74) | 18 (95) | 18 (95) | 06 (32) |

***(Source: Test-checked DHs)***

It can be seen from **Table 3.3** that all the six test-checked DHs lacked the full range of pathological services.

Thus, DHs were not providing pathological services as prescribed in IPHS, depriving the public from availing evidence-based health care. Non-availability of essential equipment and short deployment of skilled man-power in in-house pathological laboratories were amongst the main reasons for the absence of investigation facilities.

The Department accepted (January 2021) non-availability of full range of pathological services in two test checked DHs (Deoghar and Hazaribag) but was silent in respect of the other DHs.

[16] Clinical pathology: 29 tests, Pathology: 08 tests, Microbiology: 7 tests, Serology: 7 tests and Biochemistry: 19 tests.

### 3.2.2 Equipment and human resources

Audit noticed shortage in equipment and human resources for providing quality pathological services as under:

- IPHS prescribes 60 types of pathological equipment for hospitals depending upon their bed capacity. It was observed that, against the required 60 essential equipment, only 12 to 28 equipment were available in the six test-checked DHs. Shortage of equipment in these DHs ranged between 53 and 80 *per cent*. Audit further observed that in four[17] test-checked DHs, 20 pathological equipment were lying idle for want of repair (10), non-availability of reagent/kit (four) and being of old model (six).

- Lab Technicians (LTs) are the key personnel for in-house laboratories and are responsible for taking samples and carrying out prescribed pathological investigations. Audit observed shortfall of 16 to 77 *per cent* in sanctioned posts of LTs with respect to IPHS norms in all six test-checked DHs. Further, only 13 LTs were in position against the sanctioned 19 posts in four[18] out of six test-checked DHs.

- There were no Pathologists (Doctor) in two DHs (Deoghar and East Singhbhum) despite having sanctioned post and test reports were being issued by LTs without being authenticated by a doctor.

- Due to non-availability of full range of pathology services in DHs, the Department engaged (April and May 2015) two[19] private vendors on PPP mode for development, operation and maintenance of advanced pathology centers in all the 23 DHs. These centers were to provide only high-end diagnostic services. Thus, for routine pathological tests, patients were still dependent on in-house pathological facilities in the DHs.

The Department accepted (January 2021) shortage of pathological equipment and manpower at DH Deoghar but were silent in respect of other DHs.

### 3.2.3 Quality assurance of pathology services

According to the provisions of the NHM Free Diagnostics Services Initiatives, 2015, all laboratories in district hospitals would be encouraged to achieve NABL accreditation. A system of regular sample cross-checking of diagnostic results with identified reference laboratories such as the All India Institute of Medical Sciences (AIIMS) or Christian Medical College (CMC), Vellore etc., was also to be established to ensure External Quality Assurance (EQA), required for NABL accreditation.

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17 Deoghar, East Singhbhum, Hazaribag and Palamu
18 Deoghar, East Singhbhum, Ramgarh and Ranchi
19 M/s MEDALL: 12 districts and M/s SRL Limited: 11 districts.

Audit observed that all the six test-checked DHs had not obtained NABL accreditation for their pathological laboratory during 2014-19. Further, none of the test-checked DHs sent samples of their test results for external assessment and validation during 2014-19 for reasons not available on record. EQA were also not ensured in respect of test results of the two outsourced private vendors by four (except Palamu and Hazaribag) out of six test-checked DHs. Thus, minimum quality standards in pathological services were not ensured.

The Department accepted (January 2021) absence of NABL accreditation for DH, Deoghar but was silent in respect of the other test-checked DHs.

### 3.2.4 Waiting time and turn-around time

Time taken in receiving samples from the patients after being prescribed by the doctors for investigations i.e., Waiting Time (WT) and time taken in getting the investigation done and reporting the results to the patients i.e., Turn-around Time (TAT) reflects the overall efficiency of the pathology services in terms of patient's satisfaction.

Audit observed that in-house Pathology units of all the six test-checked DHs maintained registers manually indicating name of the patients, their registration numbers and prescribed pathological tests mentioned in OPD slips. However, the time of sample collection, samples sent to lab, test reports received and test reports handed over to patients were not recorded in the register. As such audit could not ascertain waiting time and turn-around time to assess efficiency of the pathology services.

The Department did not furnish specific replies to the audit observation.

***To sum up,*** *the provisioning of diagnostic services in the test-checked hospitals was sub-optimal and marred by inadequacy of prescribed equipment and shortage of human resources, thus depriving patients of evidence-based treatment procedures. Further, the lack of monitoring of waiting time and turn-around time adversely affected the ability of hospitals to measure and improve the efficiency of diagnostic services.*