

Ministry of Health

Advanced Imaging Tests – Follow-up Audit

Advanced Imaging Tests – Follow-up Audit

Background

Medical imaging is a field of tests in which internal parts of an examined body are visually depicted using images.

Medical imaging is used for clinical diagnosis, such as detecting severe diseases, planning patient treatment, monitoring their condition, physiological research, and assistance before and during invasive activity.

This report focuses on three advanced imaging tests performed with advanced imaging machines – MRI¹, CT², and PETCT³ scanners.

Radiology specialists interpret MRI and CT scans, while PETCT scans are interpreted by nuclear medicine specialists. This report follows up on findings from a previous report published in May 2015 – "Advanced Imaging Tests⁴."

Israel has instituted a policy designed to, among other things, reduce the demand for expensive tests and the financial expenditure associated with them by restricting the supply of medical devices. Among other measures, this is done by limiting licensing for machines based on population size. Public Health Regulations (Special Medical Devices), 1994 were enacted to implement the policy. The Regulations address, among other things, CT, MRI, and PETCT scanners and specify the criteria for licensing and determining the rate of devices per capita.

According to the Public Health Ordinance 1940, the Minister of Health, with the approval of the Minister of Finance and the Health Committee of the Knesset, shall outline the regulations, rules, tests, and criteria for licensing medical devices, subject to various considerations. From the above mentioned, any change in the device quotas specified in the Public Health Regulations (Special Medical Devices), 1994 requires approval from the Ministry of Finance

¹ Magnetic Resonance Imaging (MRI) – an imaging device based on magnetic resonance. MRI enables imaging and diagnosis of medical conditions without ionizing radiation and with high sensitivity.

² Computed Tomography (CT) – A device using a radiation source that rotates around the patient and passes X-rays through the body at different angles and cross-sections.

Positron Emission Tomography Computer Tomography (PET-CT) – A device that combines positron (elementary particles in a positively charged atom) emission tomography (PET) and computed tomography (CT). In this test, radioactive substances are injected into the patient, absorbed by target tissues, and used to examine tissue activity, metabolism, and processes within an organ or tissue during illness. The test combines the use of a PET scanner and a CT scanner.

⁴ State Comptroller, Annual Report 65C (2015), "Advanced Imaging Tests", p. 609.

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and subsequently from the Health Committee of the Knesset. Since the previous audit, the Public Health Regulations have been updated with increased quotas for the three imaging machines, adding dozens of advanced imaging machines.

Key Figures

about NIS **2.7** billion

the total national expenditure on imaging tests (MRI, CT, PETCT) in 2022, according to the State Comptroller's Office estimate

about 512,000, about 1.4 million, about 100,000

the number of tests performed in Israel in 2022 by MRI, CT, and PETCT machines, respectively

56 days and 110 days

waiting times for breast MRI examination at Clalit and Maccabi HMOs, according to Ministry of Health data for 2022

60 MRI, 93 CT, 20 PETCT machines

the number of machines in Israel as of 2022. 35 MRI machines, 27 CT machines, and 11 PETCT machines were added compared to the previous audit in 2014. Despite this addition, the quantities remain insufficient to meet the existing shortage and demand

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50.8 and 43.6

number of MRI tests per 1,000 people⁶ at Maccabi HMO, compared to Leumit HMO in 2022. The variance in the number of tests was not examined by the Ministry of Health

14–30 working days

the maximum time for interpreting an MRI scan set by the nine centers at the followup audit. In the previous audit, the time was up to 10 working days

only in **5** out of **17** hospitals⁵

a radiologist interprets chest Xrays and the rest are interpreted by attending physicians

Six months

average waiting time for MRI tests under anesthesia for children in the morning in 10 hospitals

Audit Actions

In 2015, the State Comptroller's Office published a report on advanced imaging tests (the previous audit). From January to September 2023, the State Comptroller's Office examined the extent to which the main deficiencies noted in the previous report were rectified (follow-up audit): the policy of limiting the number of imaging machines, long-term planning for acquiring imaging machines; their number and geographical distribution; management of the waiting lists for tests; processes for interpreting and pricing imaging tests; and professional workforce in imaging. The audit examined topics not included in the previous audit; hence, the extent of rectification of deficiencies in connection with these topics was not assessed, including the use of artificial intelligence (AI⁷) in imaging tests.

The audit was conducted at the Ministry of Health, in four health maintaining organizations (HMO): Clalit Health Services, Maccabi Healthcare Services, Meuhedet health care organization and Leumit Healthcare Services; in the following hospitals: 11 general government hospitals, seven hospitals of Clalit HMO, Assuta Hospital in Ashdod, and at the Ministry of Finance. Supplementary examinations were conducted at the Israeli Radiological Association, the National Council for Imaging⁸, and the Civil Service Commission.

⁸ National councils are professional bodies that advise the Ministry of Health's management on medical matters – in prevention, diagnosis, and treatment. Their recommendations are presented to ministry policymakers for decision-making. Ministry representatives are members of each national council. Currently, 24 national councils operate within the Ministry of Health.



⁵ one of which is a children's hospital.

⁶ A standardized number calculated according to the number of the HMO's members and weighted by the member's age, gender, and distance of his residence from the center.

⁷ Artificial Intelligence – AI. An attempt to simulate human intelligence through a machine (computer).

Key Findings

The Policy of Limiting the Number of Imaging Machines and the Duration of Processes - the previous audit raised that the policy designed, among other things, to reduce the demand for expensive tests by limiting the supply of medical machines was implemented in Israel. This is done, among other methods, through limitations imposed on licensing machines based on population size - CON⁹. The Public Health Regulations (Special Medical Devices), 1994 stipulate that a "special device" can be purchased or used only if a license "in writing from the director [Director General of the Ministry of Health or someone authorized for this purpose]" is obtained. The regulations relate, among other things, to CT, MRI, and PETCT machines. They elaborate on the criteria for granting a license and determine the number of machines per population and their distribution. The process of obtaining a license to operate imaging machines takes many years. The Ministry of Finance needed to regulate, with the approval of the Knesset's Labor, Welfare, and Health Committee¹⁰, the change in the number of machines. At the same time, the Ministry of Health conducted a bureaucratic process leading to the approval of licenses for medical centers. The follow-up audit found that this deficiency had not been rectified. The licensing process was not shortened, and the regulations were not amended. The process of obtaining a license to operate imaging machines still takes many years due to various bureaucratic constraints, including the need for the Ministry of Finance's consent and the need to update the regulations. For example, the appendix to the regulations for MRI machines was amended in 2013, 2016, and 2022; whereas the appendix to the regulations for PETCT machines was amended in 2014 and 2019 and has not been changed since.

It was also raised that the Ministry of Health commissioned a study on mechanisms for regulating the purchase and use of expensive imaging technologies in an international comparison. The study indicated three main mechanisms: Regulation – requiring Certificate of Need (CON), licenses or purchase approvals, and restrictions on the number and quality of machines; financial tools – the most common mechanism used, for example, in payment mechanisms, budget limitations, adherence to conditions, and setting income or service caps; and centralized procurement – according to the study, there is a trend of adopting such a mechanism. One of the study's recommendations is to replace the existing CON mechanism in Israel with multi-year plans to be approved by the Ministry of Health or its representative. The study findings were submitted to the

⁹ Certificate of Need – machine limitation policy.

¹⁰ Following the establishment of the Israel's thirty-sixth government, the committee was split into the Labor and Welfare Committee and the Health Committee, which was in charge of these regulations at the time of the followup audit.



ministry in January 2022; however, as of the end of the follow-up audit, the ministry had not discussed the findings.

Multi-Year Plan for Acquiring Imaging Machines – the previous audit raised that the Ministry of Health lacked a multi-year plan for acquiring various imaging machines and failed to consider future needs. The follow-up audit found that the deficiency was partially rectified. In 2015, the ministry prepared a national plan for MRI, setting short-term, medium-term, and long-term goals on medical personnel, technician training, incentives for HMOs to shorten waiting times and increase machine utilization, training radiologists for "sub-specialization" in interpretation, establishing a monitoring and control system, transparency and public reporting, addition of new machines, interpretation procedures, and pricing and accounting processes. However, the plan did not set quantitative targets for the period it referred for acquiring MRI machines, nor did it set a target for the ratio of machines to the population. In addition, the plan was not accompanied by a budget allocation for its implementation. The "index for the number of imaging machines relative to the population" was indeed updated in the Public Health Regulations; however, as of the end of the follow-up audit, the Ministry of Health still does not have multi-year plans for acquiring imaging machines. It was also found that for the years that have passed, essentially since 2013, the Ministry of Health has not submitted a multi-year plan for acquiring imaging machines to the Knesset Health Committee.

The Number of Machines and Imaging Tests – International Comparison – since the previous report was published, many imaging machines have been installed (35 MRI machines, 27 CT machines, and 11 PETCT machines). However, they did not keep up with the then considerable shortage, population growth, and the increasing demand for these tests. The number of MRI and CT machines per million people in Israel is still lower than in the 13 OECD countries examined (6.6 MRI machines per million people; 9.8 CT machines per million people). The number of PETCT machines per million people in Israel is higher than in only three countries (Poland, Czech Republic, and Greece) (1.7 PETCT machines per million people). On the other hand, the number of tests per machine in Israel is the highest among the 13 countries examined, i.e., the utilization rate of the machines in Israel is higher than in other countries (10,000 MRI tests per machine per year; 17,000 CT tests per machine; 5,000 PETCT tests per machine). The low number of machines in Israel and the high demand for tests compel imaging centers to operate the machines around the clock. This means that patients are sometimes required to undergo tests at night. The previous report noted in this context that a 2014 document from the Research Division of the Bank of Israel stated that the intensive use of existing scanning equipment indeed saves additional investments and restrains the increase in ongoing expenses; however, it could compromise the level of service to patients, who sometimes have to wait a long time for an appointment or be tested very late at night.

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- Geographical Distribution of Imaging Machines the previous audit raised that the Ministry of Health approved the three imaging machines based on nationwide calculations rather than regional needs¹¹. The previous audit did not examine data regarding MRI and CT machines. The follow-up audit found that the deficiency was partially rectified and that gaps emerged about MRI and CT machines as well:
 - MRI Machines the total number of MRI machines rose from 38 in 2015 to 60 in 2022. However, as of 2022, the number of machines per capita in the central district is lower than the regulations specify 1:196,000 compared to 1:161,000 according to the regulations (a gap of about 18%). In the north district, the ratio is 1:171,000 compared to 1:161,000 according to the regulations (a gap of about 6%).
 - CT Machines the number of CT machines rose from 68 in 2015 to 93 in 2022. However, as was the case in 2015, as of the follow-up audit, the number of machines per capita in the central and north districts is lower than the regulations specify (1:103,000) in the central district (1:130,000) by about 21% and in the north district (1:110,000) by about 6%. Conversely, the south district, which previously fell short of regulatory compliance during the initial audit, successfully adhered to regulations during the follow-up audit. This accomplishment was facilitated by the acquisition of six additional CT machines.
 - PETCT Machines the previous audit raised that there was no equality between the districts in allocating these machines. The North district had no such device, while the Jerusalem and Tel Aviv districts had more devices than the established index. The previous report noted that this inequality compromises the service received by some residents compared to others. The follow-up audit found that the deficiency was partially rectified. Except for the Central district, the number of PETCT machines rose in all other five districts, and overall, their number increased from 9 in 2015 to 20 in 2022. In the north district, where no machine existed during the previous audit, three devices were installed; however, this district still fell short compared to the regulations during the follow-up audit.
- Shielding of Imaging Centers in Hospitals at the time of the summary of the follow-up audit report draft, Israel was engaged in a war ("Iron Swords") that broke out on October 7, 2023. The first day of the war was characterized by massive missile fire toward Israeli territory, especially the south region, the murder of over 1,400 people, and the kidnapping of over 250. Many injured were referred on this day to hospitals in the south Soroka in Be'er Sheva and Barzilai in Ashkelon. Many of the injured required imaging tests such as CT and some MRI as well, including for urgent surgery. However, it was found that at Soroka Hospital, only some machines were in shielded buildings:

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¹¹ Health Ministry districts with advanced imaging machines – North, Haifa, Central, Tel Aviv, Jerusalem, and South.



one out of three CT machines and one out of two MRI machines. Only during the fighting was the second MRI machine subsequently shielded. However, it was found that at Barzilai Hospital, all the devices were in a shielded building so that patients could be safely examined and diagnosed even in emergencies.

Establishing Maximum Standard Waiting Times for Imaging Tests – the previous audit raised that the Ministry of Health had not set a standard for the maximum waiting time for imaging tests of various types, according to the level of urgency. Moreover, although such a standard could help the decision-making process for granting operating licenses for imaging devices, the ministry failed to establish it. It issued licenses without considering the desired waiting time for tests. The National Health Insurance Law, 1994 stipulates that health services in the national list of health services should be provided within a "reasonable time"; however, the law does not define a reasonable time. Due to the lack of a definition for "reasonable time," the Ministry of Health does not have an actual index by which it can evaluate the quality of service, which negatively impacts the examinees. **The follow-up audit found that this deficiency had not been rectified.** No standards for maximum waiting times were defined. The definition of "reasonable time" remains vague, potentially harming examinees whose tests are delayed.

• Waiting Time for Scheduled MRI Tests – the previous audit raised that in some medical centers and for some types of imaging tests, the waiting time for outpatients (not hospitalized) is long, which could result in a late diagnosis of the disease and harm treatment options. The follow-up audit found that the deficiency was partially rectified. In some hospitals, the waiting time for MRI tests was shortened, while in others, it is longer. There is a difference between the waiting time for tests conducted in the morning, which is longer, and the waiting time for tests conducted in the afternoon or evening, which is shorter. For example, the waiting time for a morning MRI test at Ichilov was a month and a half during the follow-up audit – an improvement compared to the previous audit. At Beilinson, the waiting time during the follow-up audit was four to five months - a worsening compared to the previous audit. For children's tests under anesthesia in the morning, patients at the 10 hospitals that performed these tests during the follow-up audit waited an average of about six months (a longer time than they waited for this test at the time of the previous audit). In contrast, in the afternoon or evening, the waiting time for this test was, on average, half the time, only about three months.

Publication of Waiting Times for Imaging Tests – the previous audit raised that waiting times for imaging tests were not made public, and examinees did not have accessible information about waiting times from providers. This prevented them from choosing the appropriate provider and required them to do a survey to find one. The follow-up audit found that this deficiency had not been rectified. The Ministry of Health has not established a national information center for imaging test appointments. Consequently, waiting times for imaging tests at providers are not made

public, and patients still need to conduct their surveys to find a provider with a shorter waiting time. Patients from disadvantaged and ailing populations find it challenging to perform this search on their own. In the absence of a consolidated national information system, it is also possible that one location may experience overload while another may have underutilized machines.

Reporting by HMOs to the Ministry of Health on Waiting Times for Certain Tests – the previous audit raised that a Medical Administration circular dated December 2013¹² mandated that starting in 2015, regarding specific medical procedures (not only imaging), the HMOs must report to the Ministry of Health on the total number of days (including Saturdays and holidays) from the time patients schedule an appointment until the procedure is carried out. These medical procedures include brain MRI tests and brain MRI tests under anesthesia. The previous audit found that contrary to the circular, the HMOs have not informed on waiting times for imaging tests in general and MRI tests in particular. The follow-up audit found that this deficiency had not been rectified. The HMOs still fail to report to the Ministry of Health the total duration from when patients contact the HMOs to schedule an appointment for MRI brain tests and MRI brain tests under anesthesia to the actual test date. The Ministry of Health failed to insist on receiving these reports from the health funds and did not include waiting times as a quality index for hospitals. Thus, the Ministry lacks information on this medical field it sought to examine.

Interpretation Times for Imaging Tests – in the previous audit, it was raised that the Ministry of Health failed to establish maximum interpretation times for imaging tests, and the imaging centers set their interpretation times. The follow-up audit found that this deficiency had not been rectified. The Ministry of Health failed to set maximum waiting times for the interpretation of imaging tests for all imaging centers in Israel, nor did it establish standards. Hospital imaging centers set their own maximum time for providing imaging test interpretation results. Since the previous report was published, some of the maximum interpretation times set by hospital imaging centers have changed: Nine centers extended this period from ten days at the time of the previous audit to 14–30 working days (not including Fridays, Saturdays, and holidays) during the follow-up audit.

Interpretation of Chest X-rays and Orthopedic Images Not Performed by Radiologists – the previous audit raised a shortage of radiologists, resulting in about 70% of straightforward imaging tests such as chest X-rays and orthopedic images in hospitals being interpreted by the attending physician, who is not a specialist in interpreting these imaging tests. Furthermore, the National Imaging Council and the National Council for Surgery, Anesthesia, and Intensive Care recommended in 2013 that

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¹² Medical Administration Circular 49/2013, "Reporting on the duration of waiting in the community for a doctor's examination and medical services" (December 2013).



straightforward orthopedic images, including radiographs, be interpreted by a radiologist or an orthopedist. However, complex chest imaging and orthopedic imaging tests, such as MRI, CT scans, and bone mapping should only be interpreted and summarized by radiologist. During the previous audit, no procedure had yet been written. **The followup audit found that this deficiency had not been rectified.** Only five out of 17 hospitals have adult chest X-rays interpreted by a radiologist¹³. In two hospitals, only 10% of the X-rays are interpreted by a radiologist. In six hospitals, the rate of tests interpreted by radiologists ranges from 40% to 85%. In the remaining three hospitals, none of the chest X-rays (except for pediatric X-rays) are interpreted by a radiologist. Regarding adult orthopedic X-rays, the audit found that only four out of 17 hospitals have X-rays interpreted by radiologists. In comparison, in 12 hospitals, radiologists do not interpret 90% to 100% of the tests.

Quality Control of the Interpretation of Advanced Imaging Tests – the previous audit raised that no systematic and structured process exists for imaging test interpretation quality control. In addition, the Ministry of Health failed to establish how to perform quality control on the interpretations or manage the learning process from the findings. The follow-up audit found that this deficiency had not been rectified. The Ministry of Health failed to establish a structured and systematic mechanism for quality control of imaging test interpretations through repeated interpretations.

Advanced Imaging Tests as Part of Hospitalization and Emergency Care – the previous audit raised that if an inpatient undergoes advanced imaging tests, which are expensive, the hospital is not compensated for these tests. In addition, it was found that there is significant variation between hospitals in the rate of advanced imaging tests performed as part of their hospitalization out of the total number of such tests conducted in the medical centers (including tests for outpatients)¹⁴. The follow-up audit found that this issue has not been rectified. Significant variation remains between hospitals in the rate of MRI and PET-CT scans performed on inpatients. For example, the rate of MRI scans for inpatients out of the total MRI scans performed in the medical centers (including tests for outpatients) was about 28% at Bnei Zion and Hillel Yaffe, about 18% at Sheba, about 6% at Kaplan, Meir, and Ichilov, about 4% at Shamir, about 3% at Wolfson and Barzilai, and about 1% at Assuta Ashdod.

Regarding PET-CT scans, the rate of advanced scans for inpatients was about 3% at Rambam and Bnei Zion, about 2% at Beilinson and Sheba, about 1% at Shamir, and about 1% at Ichilov, Assuta Ashdod, and Ziv. Furthermore, the Ministry of Health failed to examine the reasons for the variation between hospitals in the number of imaging

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¹³ One of the hospitals is a children's hospital.

¹⁴ For example, the rate of MRI scans for inpatients at Shamir was 2.5%, whereas at Sheba it was 17.4%. Regarding PET-CT scans, at Ichilov only 1% of the scans were for inpatients, whereas at Sheba it was 13.9%.

tests during hospitalization. It did not advise hospitals on when to perform these tests on patients during hospitalization before discharge to the community.

Shortage of Personnel and Workforce Headcount Standards for Radiologic Technologists, Radiologists, and Nuclear Medicine Specialists (imaging **professions)** – the previous audit raised that the Ministry of Health failed to perform long-term strategic planning to meet the country's needs in the radiology professions, nor had it examined the existing shortage of radiologic technologists in imaging centers across the country or the future needs in the field. Nor did the Ministry have an updated database on the number of practicing radiologic technologists, their expected retirement, and a forecast for integrating new radiologic technologists into the field. In addition, the Ministry of Health lacks information on the number of radiologists. The Ministry of Health also failed to match the existing workforce to the required number based on the workforce headcount standards set by professional committees. The workforce headcount standards for radiologists, established as early as 1976, are outdated and do not reflect significant technological advancements. The follow-up audit found that this deficiency had not been rectified. The Ministry of Health does not have a longterm strategic plan to meet the country's needs for medical radiologic technologists. The ministry does not estimate how many medical radiologic technologists are needed or will be required to provide adequate care. It was also found that the ministry had not determined the headcount of the workforce standard, which is necessary for the imaging professions, including the standard for radiologists in hospitals, based on the number of existing imaging devices and projected growth in their number. In addition, the ministry has no estimate of the shortage of these doctors.

Price of an MRI Test – according to the Ministry of Health's tariff, the cost of an MRI test averaged about NIS 2,200 during the follow-up audit. The HMOs purchase the tests at a reduced rate, about NIS 1,600, depending on their hospital agreements. The fees for tests at the HMOs' centers are 40%–50% lower than the price they pay to the hospitals. Due to the HMOs' desire to save costs, they prefer to refer their members to affiliated centers. Since the geographical distribution of centers affiliated with each HMO is limited compared to the national distribution of all imaging test providers, prioritizing members' referrals to affiliated centers for economic reasons could adversely affect the accessibility and availability of MRI tests for patients.

Regulation of the Radiology and Imaging Profession by the Ministry of Health – in the previous audit, it was noted that in the absence of a law regulating the practice of radiology and imaging, the Ministry of Health was barred from granting "professional recognition certificates," nor could it fulfill its role as a regulator of health professions, i.e., exercise control and supervision over education, training, and the professional level

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of personnel employed in this field (excluding the personnel employed by it in government hospitals). At that time, the imaging centers in non-government hospitals were not obligated to employ qualified operators. They could use anyone, even unqualified individuals, to perform X-ray tests involving ionizing radiation. **The follow-up audit raised that this deficiency has been fully rectified.** The profession of medical imaging has been regulated: In early August 2023, Amendment No. 8 to the Regulation of Medical Professions Law, 2008, was adopted. This amendment stipulated, among other things, that a radiographer (medical imaging technologist) must hold a bachelor's degree in medical imaging ¹⁵ or a bachelor's degree from a recognized institution of higher education and complete studies in medical imaging according to a program approved by the director, based on rules set by the minister with the approval of the Knesset Health Committee.

Lack of Chief Radiographer in the Ministry of Health – the previous audit raised that the Ministry of Health lacked a Chief Radiographer, resulting in the following issues remaining untreated: There is no guiding authority for radiology to outline the operation of imaging machines, set procedures, and conduct quality controls in imaging centers (types of images, execution techniques, adding images when a life-threatening pathology or organ is detected); there is no authority ensuring that the professional content taught in radiology schools is updated from time to time as needed. Some of these issues are delegated among various units within the ministry; however, there is no entity to oversee them from a systemic perspective. The follow-up audit raised that this deficiency has been fully rectified. In November 2017, a Chief Radiographer was appointed in the Ministry of Health.

Key Recommendations

It is recommended that the Ministries of Health and Finance simplify and shorten the process for granting licenses for imaging devices while ensuring that the required number matches the necessary professional staffing levels. As part of reviewing the procedures, it is recommended that the research recommendation be implemented to consider the need for restriction policies and transitioning to a multi-year procurement plan approved by the Ministry of Health. It is also recommended that the Ministry of Health prepare a multi-year plan for gradually acquiring imaging devices according to needs and projected population growth. In addition, an appropriate budget plan should be formulated for this purpose.

It is recommended that the Ministry of Health set service indicators for advanced imaging tests to define a standard time for tests, according to the type of test and level of urgency, for proper medical care and services.

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¹⁵ Medical imaging: the production of images for medical diagnosis or treatment of a person using ionizing radiation (X-ray, CT), sound waves (Ultrasound), or magnetism (MRI).

The Ministry of Health should investigate the reasons for the disparities (some of which are great) in waiting times for advanced imaging tests among the different HMOs. This should include consideration of the number of tests performed by each HMO and the ratio of tests to the HMOs' members. This examination is necessary to address barriers causing long waiting times in some HMOs and ensure equal service levels for all members. The Ministry of Health is recommended to establish a national information center for appointments, allowing HMOs' members to choose the most suitable provider and schedule their tests accordingly.

To ensure that the interpretation of both complex and straightforward imaging scans is accurate and assists in efficiently diagnosing medical conditions, it is recommended that the Ministry of Health, in collaboration with the National Council for Imaging, develop a protocol specifying who is authorized to interpret advanced imaging tests and in which cases. In addition, it is recommended that the Ministry of Health promptly establish a structured and systematic quality control mechanism and determine the key components of the process. This should include the method of performing quality control, the regulation of ongoing monitoring and control measures, the required rate of repeat interpretations, the method of reporting and documenting the procedure; a mechanism for learning from the findings, and methods for disseminating these lessons. It is also recommended that the Ministry of Health regulate waiting times for the interpretation of imaging tests and define a standard for the maximum interpretation time. Measuring hospitals' compliance with this standard will help identify gaps and address the shortage of radiologists accordingly.

Furthermore, the Ministry of Health should analyze the reasons for significant variation among hospitals in conducting advanced imaging tests during hospitalization. Based on this analysis, criteria should be established to guide hospitals in deciding when to perform these tests during hospitalization rather than after discharge.

It is recommended that the Ministry of Health determine the workforce headcount standards for imaging centers in hospitals, including radiologists, nuclear medicine specialists, and radiographers. In addition, the ministry should develop a multi-year plan to fill the positions specified in these standards.

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Number of Imaging Devices per Million People and Number of Tests per Device in Selected OECD Countries*, 2022



* The data on MRI devices are the most updated and known for 2022, as received from the OECD and compiled by the Division of Medical Technologies, Information, and Research of the Ministry of Health in April 2023. The data on PETCT and CT machines are updated to 2021 as they appear on the OECD website [source].

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Summary

Medical imaging is a medical field that includes tests demonstrating internal images and sections of the examined body. This technology is used for clinical diagnosis, required treatment planning, patient monitoring, and assistance during invasive procedures (including surgery). Imaging tests are fundamental tests required before almost any medical diagnosis and procedure. In recent decades, there has been a sharp increase in the volume of advanced imaging tests performed in Israel and worldwide, accompanied by significant technological improvements in MRI, CT, and PETCT machines.

The follow-up audit has raised that most of the deficiencies noted in the previous audit have not been rectified: The Ministry of Health lacks a multi-year plan for acquiring the three advanced imaging devices. Since the previous audit was published, many machines have been installed; however, they did not address the significant shortage, population growth, and the increased demand for imaging tests. Upon the audit's completion, the number of devices per million people in Israel remains very low compared to OECD countries. This causes long waiting times for specific tests and the performance of tests at night. Compared to the previous audit, waiting times for particular tests have increased. As in the previous audit, deficiencies were raised regarding the quality control of imaging test interpretation, which is not standardized. This could lead to errors, erroneous decisions, and failure to learn from mistakes. Assimilation of AI systems – a relatively new technology not examined in the previous audit – across all imaging centers in Israel can assist and streamline imaging test interpretation procedures. It is recommended that the Ministry of Health promote the assimilation of these systems while ensuring ongoing oversight and continuous learning for optimal implementation.

The follow-up audit found that since the previous audit, the Ministry of Health has regulated the radiography and imaging profession and appointed a Chief Radiographer.

The critical importance of imaging tests compels the Ministry of Health to address the deficiencies noted in this report. The ministry should develop a work plan with a timetable to address these deficiencies, considering the geographical distribution of imaging devices. It should set standards for maximum waiting times for conducting and interpreting tests and address staffing issues for radiographers, radiologists, and nuclear medicine physicians in line with technological developments and the growing demand for these tests. It is recommended that the Ministries of Health and Finance explore ways to simplify and shorten the licensing process for imaging devices while examining the continued need for the CON mechanism designed, among other things, to limit national health expenditure. In addition, both ministries should prepare a multi-year equipment acquisition plan. To ensure optimal service to residents, the Ministry of Health should treat imaging as one of the cornerstones of modern medicine. This requires long-term planning and a multi-year plan outlining the needs and resources required to meet them.

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The Rectification Extent of the Key Deficiencies Noted in the **Previous Audit**

			The Rec	ciencies t		
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
Policy on limiting the number of imaging devices	Ministry of Health and Ministry of Finance	The process of obtaining a license to operate imaging machines takes many years. The Ministry of Finance needs to regulate the change in the number of machines with the approval of the Knesset's Labor, Welfare, and Health Committee. At the same time, the Ministry of Health conducts a bureaucratic process that leads to the approval of medical center licenses.				
Multi-year plan for acquiring imaging devices	Ministry of Health	The Ministry of Health did not have a multi- year plan for acquiring various types of imaging devices and failed to consider future needs.				

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			The Rec N	tification Ex Noted in the	tent of the Defi Follow-Up Audi	ciencies t
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
Geographical distribution of imaging devices	Ministry of Health	The Ministry of Health determined the total number of imaging devices based on a nationwide calculation rather than regional needs. This policy led to inequality between districts in the allocation of PETCT devices. This inequality adversely affected the service to some residents compared to others.				



			The Rectification Extent of the Deficience Noted in the Follow-Up Audit				
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified	
Establishing standard waiting times for imaging tests	Ministry of Health	The Ministry of Health failed to set a standard for maximum waiting times for various imaging tests based on urgency. Moreover, although such a standard could help the decision- making process for granting operating licenses for imaging devices, the ministry failed to use it. It issued licenses without considering the desired waiting time for tests.					
Waiting time for outpatient MRI tests	Medical centers	In some medical centers and for some imaging tests, the waiting time for outpatients (those not hospitalized) was extended. This could result in a late diagnosis of the disease and jeopardize treatment options.					

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			The Rec	tification Ex Noted in the	tent of the Defi Follow-Up Audi	ciencies t
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
The need to publish waiting times for imaging tests	Ministry of Health	Waiting times for imaging tests were not made public, and examinees did not have accessible information about waiting times from providers. This prevented them from choosing the appropriate provider and required them to do a survey to find one.				

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			The Rec	tification Ex Noted in the	tent of the Defi Follow-Up Audi	ciencies t
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
Interpretation times for imaging tests and quality control	Ministry of Health	The Ministry of Health failed to establish standards for maximum test interpretation times, so imaging centers set their interpretation times. There is no systematic and structured process for quality control over the interpretation of imaging tests. In addition, the Ministry of Health failed to set how to perform quality control on interpretations or how to manage the process of concluding.				

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Advanced Imaging Tests – Follow-up Audit

			The Rec	tification Ex Noted in the	tent of the Defi Follow-Up Audi	ciencies t
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
Shortage of workforce headcount and staffing standards for radiographers, radiologists, and nuclear medicine specialists.	Ministry of Health	The Ministry of Health lacked data on the number of radiologists. It also failed to match the existing workforce to the required scope based on the workforce headcount standards set by professional committees. The standards for radiologists, established in 1976, were outdated and did not align with technological advancements.				



		The Rectification Extent of the D Noted in the Follow-Up A				ficiencies Jit
The Audit Chapter	The Audited Body	The Deficiency Noted in the Previous Audit	Not Rectified	Slightly Rectified	Significantly Rectified	Fully Rectified
Regulation of the radiography and imaging profession by the Ministry of Health	Ministry of Health	In the absence of a law regulating the profession, the Ministry of Health was barred from granting "professional recognition certificates", nor fulfill its role as a regulator of health professions, i.e., it could not control and supervise the education, training, and professional standards of the workforce employed. At that time, the imaging centers in non- government hospitals were not obligated to use operators with any qualifications. They could use anyone, even unqualified individuals, to perform X-ray tests involving ionizing radiation.				

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