Integrating Research into Medical Residency in Israel: The role of Basic Sciences and their Long-Term Impact

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Medical residency is a critical period in the professional training and development of physicians, combining clinical practice and academic learning. In Israel, this phase is uniquely enriched by a structured integration of research, through a dedicated, paid six-month period known as Basic Sciences Research required in most medical specialties. This period is intended to immerse residents in scientific inquiry, allowing them to conduct clinical, translational, or data-based original research in hospitals, research institutes, or university laboratories. Before embarking on their research projects, residents must complete preparatory courses in research methodology, statistics, ethics, and critical reading, submit a research proposal and receive formal authorization for the research timeline and supervision. This structure ensures that the research is rigorous, ethically sound, and aligned with the resident's specialty and career goals.

The basic sciences period is not merely an academic requirement—it is a strategic component of medical education aimed at cultivating physician-scientists. Residents engage with disciplines such as cell biology and molecular medicine**,** genetics and genomics**,** pathophysiology, statistics and epidemiology. These fields provide a sound scientific foundation for understanding disease mechanisms, developing diagnostic tools, and innovating therapeutic modalities. Through hands-on research, residents learn to formulate hypotheses, design and conduct experiments, analyze data and write and submit scientific papers. This process enhances critical thinking, scientific literacy, and a deeper understanding of evidence-based medicine.

While the six-month research period is the standard requirement, alternative options exist for residents who already hold advanced degrees (e.g., MSc or PhD) or have completed equivalent research training. In such cases, residents may be eligible for exemptions or opt to participate in a parallel 6-month innovation-focused track that combines research with entrepreneurship in the bio-medical and digital health industry.

In recent years, significant steps were taken to further institutionalize the integration of research within clinical training through a proposed "Resident-Researcher" track initiated by the Young Israeli Academy of Science in Medicine. This innovative program is intended for medical residents with a proven research background, particularly those holding advanced degrees such as MSc, PhD, or MPH, who wish to maintain and advance their scientific capabilities alongside clinical specialization. The program aims to establish a continuous research trajectory from the end of medical school through the completion of residency, ultimately enabling participants to build independent research infrastructure and

generate preliminary data for future grant applications. Starting in the second year of residency, participants will be granted one day per week (approximately 200 research days over four years) dedicated exclusively to research, preferably under the mentorship of a physician-scientist in their specialty. The track will be available across all core specialties, pending approval by the Scientific Council of the Israeli Medical Association.

Another initiative, led by the Israeli National Academy of Science in Medicine, targets MD-PhD graduates. This initiative aims to provide structured support for physician-scientists during their clinical training. The program addresses a long-standing gap: despite their dual track and prolonged training, many MD-PhD graduates report limited opportunities to engage in meaningful research during residency. This delay prevents them from realizing their capabilities to establish independent research. The proposed program remedies this by granting three designated research blocks of eight months each—totaling two years of full-time research—distributed throughout residency, as well as dedicated funds to establish a research team. This structure will allow participants to initiate postdoctoral-level research, establish independent research groups, and apply for competitive grants while undergoing clinical training. This track represents a strategic investment in Israel’s biomedical future, ensuring that highly trained physician-scientists can thrive and contribute in both clinical and research domains.

The "Mavri" program is a research fellowship that presents yet another track for Israeli medical residents. The program involves a 24-month extension of the residency period, including 9 months of integrated residency and 15 months of dedicated research, during which the physician conducts research at an eligible Israeli research institution, with support and guidance from a mentor, specific program guidelines and reporting requirements. The resident's salary over the extra period is funded primarily by philanthropic and governmental sources.

The integration of research into residency has yielded significant benefits for medicine, enabling Israel to develop a robust community of physician-scientists who contribute to both clinical care and biomedical innovation. These professionals bridge the gap between bedside and bench, translating clinical observations into research questions and applying discoveries to patient care. Health care can arguably be improved as hospitals with active research environment report better clinical outcomes. Research fosters a culture of inquiry, continuous learning, and evidence-based practice. Research-active institutions are more likely to adopt cutting-edge technologies and personalized medicine approaches and have led Israeli hospitals and universities to be increasingly recognized as leaders in translational research. Initiatives that promote collaboration between clinicians and scientists accelerate the development of new diagnostics and treatments and bear potential for commercial applications of significant economic value.

The successful integration of research into residency faces some major challenges, such as chronic workforce shortages that pressure hospitals to prioritize clinical duties over research, funding limitations that restrict access to high-quality research opportunities and administrative burdens that may deter residents from pursuing ambitious research projects.

To address these issues and sustain and enhance the research culture within residency programs, stakeholders are exploring measures such as streamlining research approval processes, expanding mentorship programs and striving to offer protected research time and financial incentives.

In conclusion, Israel's model of integrating research into medical residency—anchored by the Basic Sciences Period—has proven to be a powerful catalyst for medical progress and innovation. By equipping future physicians with research skills and scientific insights, the initiative not only enriches individual careers but also strengthens the entire healthcare ecosystem. As medicine continues to evolve, the fusion of clinical practice and research will remain essential to delivering innovative, effective, and compassionate care as well as help in driving local economies.