

Selection of basic laboratory equipment for laboratories with limited resources

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WORLD HEALTH ORGANIZATION
Regional Office for the Eastern Mediterranean

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2000

WHO Library Cataloguing in Publication Data

Johns, Warren

Selection of basic laboratory equipment for laboratories with limited resources /
by Warren Johns, Mohamed M. El-Nageh

p. (WHO Regional Publications, Eastern Mediterranean Series; 17)

ISBN 92-9021-245-4

ISSN 1020-041X

1. Equipment and Supplies 2. Laboratories

I. El Nageh, M. M. II. Title III. WHO Regional Office for
the Eastern Mediterranean IV. Series

(NLM Classification: W 26)

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Cover design and layout by A. Hassanein, EMRO

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Printed in Alexandria, Egypt

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Preface

Medical laboratory technology, like any profession, requires the skillful use of appropriate tools; learning about the tools of the trade and their associate techniques is the first and most essential part of any laboratory worker's training. Thereafter, having the right scientific equipment and knowing how to use it are certainly helpful to anyone who wishes to work comfortably and competently.

Originally laboratories used *manual methods*. Laboratory workers would prepare their own reagents, standards and samples before starting an analysis. The assays used simple, cheap and stable reagents. This work at the bench involved, among other things, the use of a mechanical balance, pipettes, test tubes, a water-bath and a colorimeter. Mechanization was introduced in the 1960s after the invention of the autoanalyser in 1957. Laboratories, especially clinical biochemistry departments, underwent radical and profound change. By using automation, the numbers of tests expanded without a corresponding increase in labour.

A more recent technological development has been the simplification and miniaturization of equipment to enable tests to be carried out at a patient's bedside or at a doctor's clinic. This near-patient testing or point-of-care testing is done with the help of portable glucose meters, whole blood gas analysers and electrolyte analysers.

This same simplification of equipment has brought about the development of appropriate equipment that can be used in developing countries, for example portable water testing kits, haemoglobinometers and battery-operated pH meters. The lack of simple and practical tools for on-the-spot diagnosis often prevents accurate and timely treatment. Manufacturers need to design and provide appropriate equipment at a cost which developing countries can afford.

However, it needs to be established what exactly the appropriate tools are. Also the question has to be resolved of whether developing countries, caught between the old and the new, have to use manual methods and old-fashioned equipment or electronic equipment that is not only expensive to buy but comes with costly consumables only obtainable from the manufacturer. Working in rural areas does not mean that laboratory technologists cannot use good equipment. The need is for the best possible equipment. Often these people working in rural areas do not know what equipment is available: manufacturers' agents do not reach them, suppliers do not send their sales representatives and few subscribe to technical journals and therefore miss out on reading reviews and seeing advertisements. These laboratory workers rarely go to international, or even national, conferences and therefore do not see the range of equipment available.

The scaling back of development aid by some developed countries continues. Some developing countries have only limited financial resources to spend on health care each year. A sensible choice of laboratory equipment and consumables will ensure that money allocated to the laboratory is well spent.

A consumer in a normal economic market is assumed to have sufficient information to make an informed decision regarding consumption of a particular commodity. For the first time buyer the purchase of new laboratory equipment can be confusing. The buyer may not know what questions to ask or where to get useful information about the equipment. The choice may be too wide and therefore choosing will not be easy.

Manufacturers of hi-fi equipment, cars, do-it-yourself tools and cookers make money by bringing out new models and so persuading the purchasing public that new models must be better. In a medical setting this attitude may waste money and harm patients. When an item of laboratory equipment is needed, the laboratory worker may choose one of the old, tried and tested models or be tempted by advertising and promotion to try a newer model. However, it is often difficult to predict how reliable the new ones will prove to be. The authors hope that the information, tables, lists and notes in this book will assist all laboratory workers in choosing basic equipment for health laboratories.

The preparation of this publication would have been impossible without the continuous support and encouragement of Dr Hussein A. Gezairy, WHO Regional Director for the Eastern Mediterranean, and of Dr M.H. Khayat, Deputy Regional Director for the Eastern Mediterranean, to whom we wish to express our thanks and gratitude.

Acknowledgements

A number of people have provided information and acted as advisers for this document. Their contributions are gratefully acknowledged. The authors would like to express their gratitude to:

- John G. Dwen for his guidance and suggestions in the preparation of the computer database during the preliminary stages of information gathering and for encouraging suggestions and his valuable time spent in the critical reviewing of the text.
- Monica Cheesbrough, Tropical Health Technology, Cambridgeshire, United Kingdom (UK), for providing reports and continued encouragement.
- Corinne Lacroix, former Technique sector in charge of laboratories, Médecins sans frontières (MSF), Paris, France for comments regarding the buyer's guides.
- Fay B. Blank, Managing Director, Scientific Supplies Ltd., Panmure, Auckland, New Zealand for advice on laboratory procurement.
- Marilyn Eales, Former Charge Technologist, Haematology Department for her continued interest in the project, and laboratory staff at Middlemore Hospital, Auckland, New Zealand for advice on equipment.
- Nicole Petit, WHO Supply Services, Geneva, Switzerland for suggestions on the layout of the buyer's guides.
- C. Stuart Rennison, Scientific Laboratory Supplies, Hessle, West Yorkshire, UK; RW and SF Dunbar, Scientific and Technical Supplies Ltd., Newmarket, UK; HJ Brey, Sandberg and Schneidewind, Hamburg, Germany; and Otto Knoedlseder, General Manager Europe, Middle East and Africa, VWR Scientific, Greifensee, Switzerland, for contributing material to Chapter 7 on choosing major equipment for intermediate and peripheral laboratories.

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