



The Ministry of Health (MoH) Public Health Laboratory – Sabha Clinic Gaza City

A CRITICAL PART OF THE PUBLIC HEALTH SURVEILLANCE AND MONITORING SYSTEM IN THE GAZA STRIP

A Report by the WASH Cluster Gaza Advocacy Working Group

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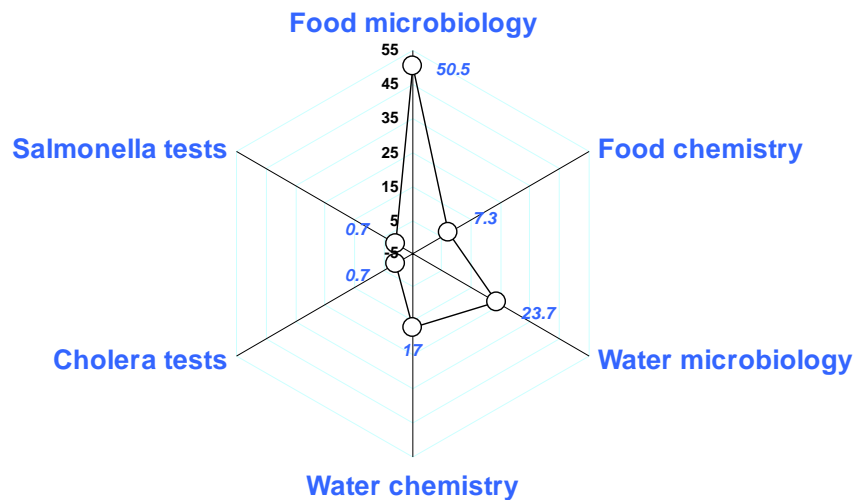
1 Ministry of Health Public Health Laboratory; 2 WASH Cluster Gaza; 3 Al Dameer Association for Human Rights, Gaza; 4 LifeSource, Gaza; 5 Institute of Water and Environment, Al Azhar University, Gaza; 6 Save the Children, Gaza; 7 Coastal Municipalities Water Utility, Gaza; 8 Oxfam GB, Gaza; 9 International Relief & Development, Gaza.

Introduction

The Ministry of Health Public Health Laboratory (MoHPhL) located at Sabha Clinic in Gaza City¹ provides a crucial service of chemical and microbiological analyses of water, food (meat, fish, canned food, oils, vegetables, milk and milk products), confectionary (biscuits, ice cream, soft drink), swimming pools, wastewater, seawater, and other samples of public health importance in the Gaza Strip.

The MoHPhL is highly productive, despite the serious operating difficulties imposed by Israel and its international supporters. The MoHPhL completed 40,925 tests in 2007 and 31,953 tests in 2008. Of all the tests conducted in 2008 (i.e. 31,953 or more than 600 per week), 50.5% (16,131) were food microbiology tests, 23.7% (7,576) were water microbiology tests, 17.0% (5,442) were water chemistry tests, and 7.3% (2,340) were food chemistry tests. Tests for cholera (232) and salmonella (232) made up 1.4% of the total tests in 2008 (MoHPhL 2009). Refer to Figure 1*.

Figure 1 Tests conducted by the MoHPhL in 2008: By sample type as a percent of the total number of tests conducted



- The radial axes show the percent of the total tests conducted in 2008 by various classes of samples from 0% (at the centre of the radial graph) to 50.5% (at the periphery of the radial graph).

The MoHPhL service is a critical component of the Public Health Surveillance and Monitoring System in the Gaza Strip, and complements the infectious disease surveillance system of the UNRWA Primary Health Care Clinics (and the MoH facilities)

¹ The MoHPhL was opened in 1999 with a donation from the Italian Government.

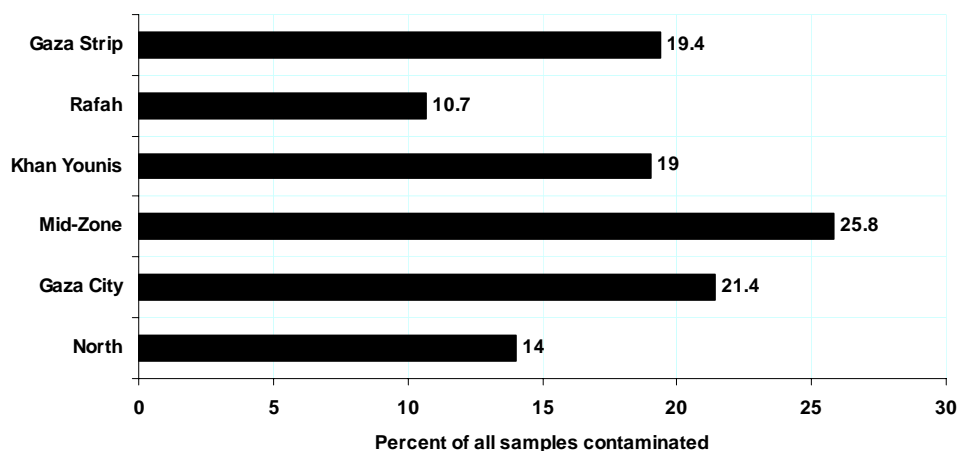
throughout the Gaza Strip (UNRWA 2009). The MoHPHL has also played a key role in training public health specialists in laboratory techniques and analysis, and provides an analytical service for important public health research projects (e.g. Abu Naser 2003; Abu Naser et al 2007; Lubbad 2005; WHO 2008).

The WASH Cluster and EWASH in Gaza have a major interest in helping to support a strong and sustainable MoHPHL. Accordingly, the Advocacy Working Group of the WASH Cluster Gaza has taken upon itself the task of promoting knowledge of the problems faced by the MoHPHL in the implementation of its roles and responsibilities in public health. We have been aware for some time that the MoHPHL has suffered much from the blockade imposed by Israel and its international supporters (Forster et al 2006). This blockade has manifested itself in terms of inoperable technical equipment, lack of reagents, and lack of international technical experts to help set up complex equipment, train local technicians, and supply essential reagents for the operation of equipment.

Methodology

The WASH Cluster Gaza Team visited the MoHPHL on Sunday 22nd March and April 1st 2009. The visit was kindly authorised and facilitated by Mr Sami Lubbad, Manager of the MoHPHL, and his staff. The photographs in this report were taken with permission of the staff of the laboratory, and show the essential equipment being set-up or currently being used to undertake important analytical work as part of the MoH Monitoring and Surveillance System, including water quality, in the Gaza Strip². We have focussed on water quality testing in this report (e.g. Refer to Figure 2), but the MoHPHL does much more than this, as shown in Figure 1.

Figure 2 The distribution of microbiologically contaminated water samples across the Gaza Strip in 2008: By Governorate



² The photographs were taken by the WASH Cluster Gaza Team in April 2009. The visiting WASH Cluster Team members were Graham Henderson and Najla Shawa.

Results

1. THE LABORATORY

Figures 3a,b,c **Dionex system for measuring inorganic cations and anions, showing various components - gradient pump, detector, column, and computer control**



Figure 3a



Figure 3b



Figure 3c

Figures 4a,b,c,d **Photometer, Spectrophotometer, and pH equipment for measuring various chemicals such as nitrate, sulphate etc**



Figure 4a



Figure 4b



Figure 4c



Figure 4d



Figure 5 The essential task of keeping laboratory glassware clean



Figure 6 High Performance Liquid Chromatograph (HPLC) – for specific analyses

Figures 7a,b,c,d Water purification, hydrogen generation, autosampler, and Atomic Absorption equipment



Figure 7a



Figure 7b



Figure 7c



Figure 7d



Figure 8 Mass Spectrometer and Gas Chromatograph for detection of contaminants of food and water



Figure 9 Atomic Absorption Spectrometer

Figures 10a,b,c,d,e Mr Sami Lubbad working on a Perkin Elmer Atomic Absorption Instrument



Figure 10a



Figure 10b



Figure 10c



Figure 10d



Figure 10e

Figures 11a,b,c

Cold storage of temperature sensitive laboratory materials and reagents



Figure 11a



Figure 11b



Figure 11c

2. OUTPUTS OF THE LABORATORY RELATING TO WATER QUALITY

Figures 12, 13, and 14 show summary results of water quality testing at the MoH PHL in the Gaza Strip in 2008.

Figure 12 Percent of water samples tested in 2008 (by the Ministry of Health Public Health Laboratory) contaminated with **Faecal coliforms**: *By Governorate and source of water*

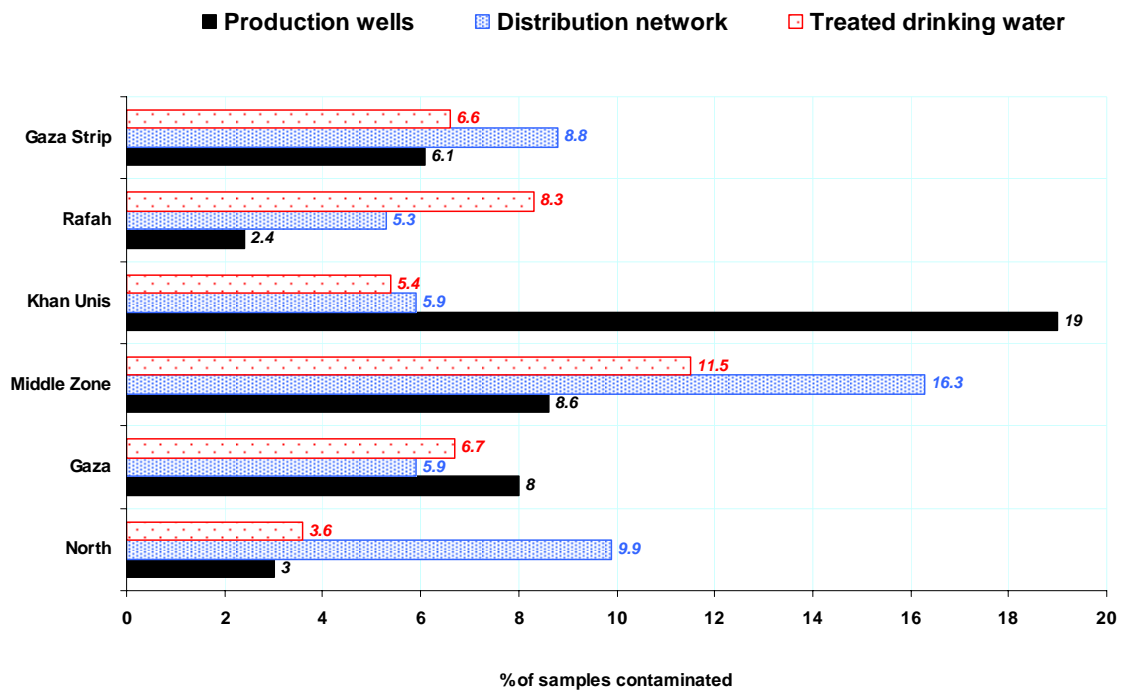


Figure 13 Percent of water samples tested in 2008 (by the Ministry of Health Public Health Laboratory) contaminated with **Total coliforms**: *By Governorate and source of water*

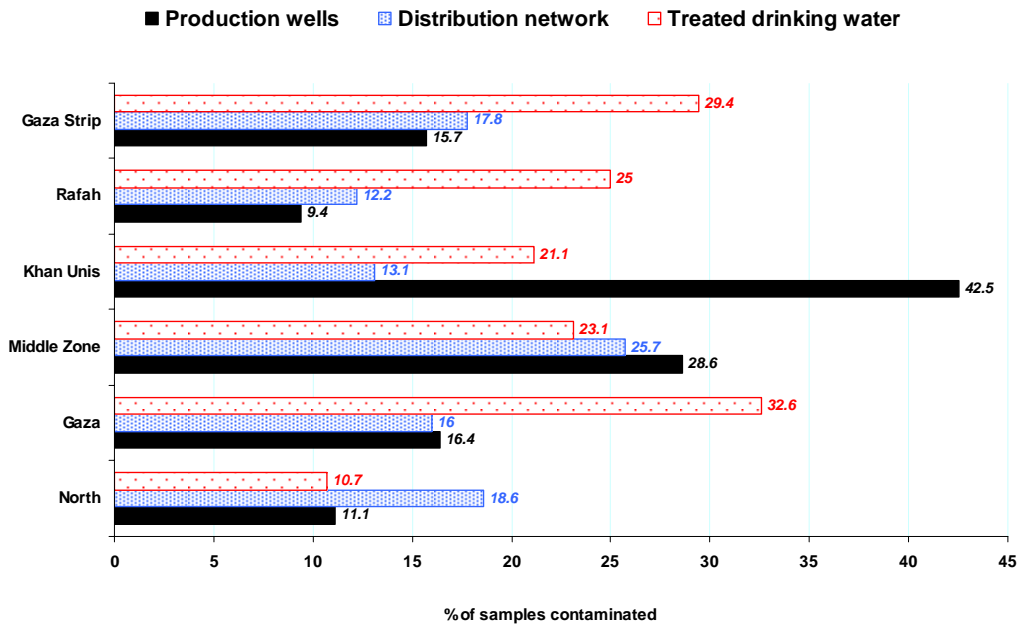
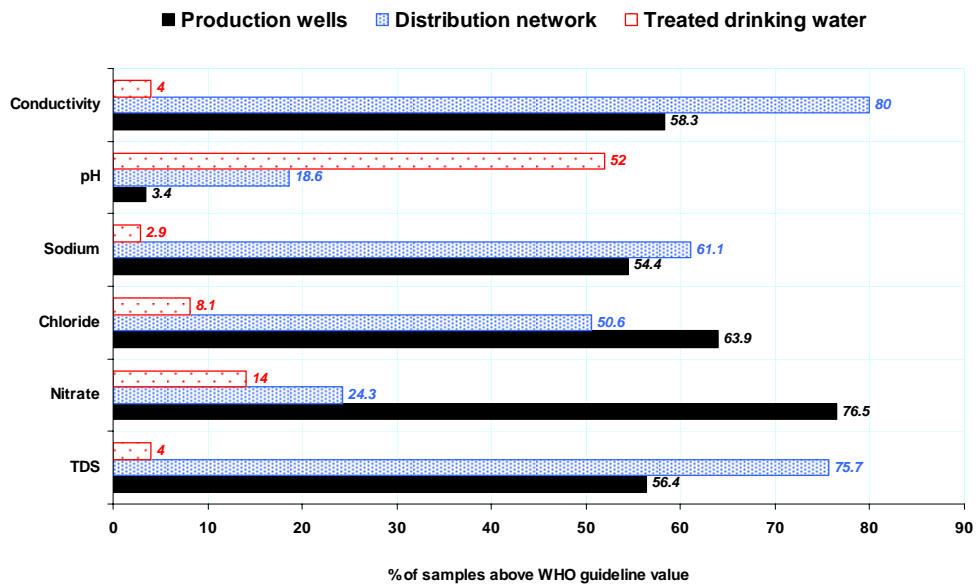


Figure 14 Percent of water samples tested in 2008 (by the Ministry of Health Public Health Laboratory) above the WHO guideline value for selected **chemical variables**: *By source of water*



The microbiological test results shown in Figures 12 and 13 reflect the unsatisfactory situation with respect to the safe disposal of sewage/wastewater across the whole Gaza Strip, and in particular Khan Unis and the Middle Zone where there are no proper sewage networks or completed wastewater treatment facilities.



Figure 15 **The sewage contaminated stormwater lake, Khan Unis, April 2009**



Figure 16 **Wadi Gaza in the Middle Zone heavily polluted with sewage**



Figure 17 Untreated sewage entering the sea from Wadi Gaza in the Middle Zone

The WHO is monitoring the relationship between incident cases of watery diarrhoea presenting at UNRWA Primary Health Care Centres across the Gaza Strip and surveillance samples of water (collected by the MoH and CMWU) that are contaminated with Faecal and Total Coliforms as tested by the MoHPHL (WHO 2009). This monitoring is critical for timely and effective public health interventions to prevent major outbreaks of infectious disease. The MoHPHL is also responsible for testing seawater samples contaminated by sewage at various points along the Gaza Strip coast (WHO 2008). However, the sensitivity of the surveillance system is seriously constrained by the limited number of health facilities currently participating (!7 UNRWA PHC Centres) and the Israeli blockade constrained laboratory testing capacity of the MoHPHL.

The high levels of nitrate in water sources across the Gaza Strip - as shown in Figure 14 (MoHPHL 2009), the relation between sewage disposal and nitrate levels in groundwater (Lubbard 2005), and the relation of nitrate contamination of groundwater with methaemoglobin levels among infants in Gaza (Abu Naser et al 2007), also reflect the very unsatisfactory situation with respect to the safe disposal of sewage and wastewater in the Gaza Strip (World Bank 2009).

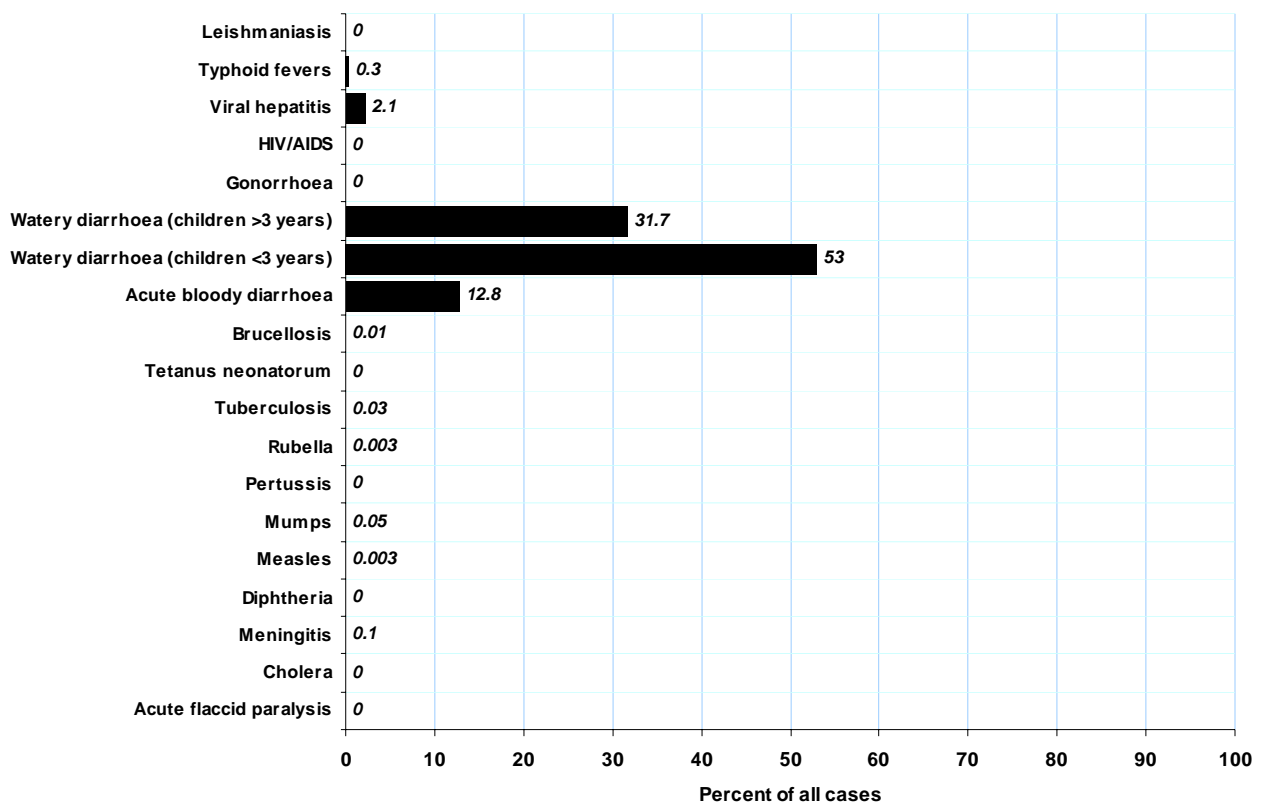
The MoHPHL plays a critical role in the Public Health Monitoring and Surveillance System in the Gaza Strip³. More specifically, the MoHPHL provides accurate and reliable water quality test results that are required by the CMWU, other WASH partners, and the Health Sector to ensure public health safety (WHO 2009).

³ We have focussed on water quality testing, but the MoHPHL also plays an important role in the safety of foodstuffs and other areas of public health concern, as shown in Figure 1.

The WASH Cluster has a particular interest and responsibility in the quality and safety of the water available to the people of the Gaza Strip. Figure 18⁴ shows how important WASH-related faecal-oral transmitted infectious illnesses (watery diarrhoea, acute bloody diarrhoea, and viral hepatitis) are in the Gaza Strip, and why we must comprehensively monitor the safety of water and urgently strive to develop/upgrade the wastewater/sewage systems across the Gaza Strip for the safe disposal of human wastes which are the source of the pathogens causing these illnesses.

Many of the instruments shown in Figures 3-10 of this report were donated to the MoHPhL as long ago as 2001, and have not been operating since they were donated. This is a direct result of the restrictive policies and siege by Israel.

Figure 18 Surveillance of 19 infectious conditions at **all reporting UNRWA Primary Health Care Clinics in the Gaza Strip in 2008: Percent of all cases**



⁴ The source of this data was Dr Ali El-Jaish, Field Diseases Control Officer, UNRWA, Gaza City.

Recommendation

The WASH Cluster Gaza Advocacy Working Group strongly recommends that the international community put pressure on Israel and its supporters to ensure that the MoHPhL urgently receives the resources required to increase its critical Public Health Surveillance Capacity. This must include allowing unrestricted and timely entry of all the materials, modern instruments, and technical expertise required to get the existing instruments operating in a sustainable manner.

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