



**2004**

**2004 /**

.2004 - 1425 ©

:

:2004

.2004

:

/

. - 1647 . .

(970/972) 2 240 6343 :  
<http://www.pcbs.gov.ps> :

(970/972) 2 240 6340 :  
[diwan@pcbs.gov.ps](mailto:diwan@pcbs.gov.ps) :

(SDC)

(CFG)

(PNA)

(EC)

(DFID)

.(CFG)



( )



|           |     |   |
|-----------|-----|---|
| <b>17</b> |     | : |
| 17        | 1.1 |   |
| 18        | 2.1 |   |
| <b>19</b> |     | : |
| <b>23</b> |     | : |
| 23        | 1.3 |   |
| 23        | 2.3 |   |
| 24        | 3.3 |   |
| 27        | 4.3 |   |
| <b>29</b> |     | : |
| 29        | 1.4 |   |
| 29        | 2.4 |   |
| 30        | 3.4 |   |
| 30        | 4.4 |   |
| <b>33</b> |     | : |
| 33        | 1.5 |   |
| 33        | 2.5 |   |
| <b>35</b> |     |   |
| <b>37</b> |     |   |





|    |               |     |
|----|---------------|-----|
| 39 |               | :1  |
|    | 2004 و 2003 ، |     |
| 40 |               | :2  |
|    | 2004          |     |
| 40 |               | :3  |
|    | 2004          |     |
| 41 |               | :4  |
|    | 2004          |     |
| 41 |               | :5  |
|    | 2004          |     |
| 42 |               | :6  |
|    | 2004          |     |
| 42 |               | :7  |
|    | 2004          |     |
| 43 |               | :8  |
|    | 2004          |     |
| 44 |               | :9  |
|    | 2004          |     |
| 44 |               | :10 |
|    | 2004          |     |
| 45 |               | :11 |
|    | 2004          |     |
| 45 |               | :12 |
|    | 2004          |     |
| 46 |               | :13 |
|    | 2004          |     |
| 47 |               | :14 |
|    | 2004          |     |

|    |      |      |
|----|------|------|
| 48 |      | :15  |
|    | 2004 |      |
| 49 |      | :16  |
|    | 2004 |      |
| 50 |      | :17  |
|    | 2004 |      |
| 51 |      | :18  |
|    | 2004 |      |
| 52 |      | :19  |
|    | 2004 |      |
| 52 |      | :20  |
|    |      | 2004 |
| 53 |      | :21  |
|    | 2004 |      |
| 54 |      | :22  |
|    | 2004 |      |
| 54 |      | :23  |
|    | 2004 |      |
| 55 |      | :24  |
|    | 2004 |      |
| 55 |      | :25  |
|    | 2004 | ( )  |
| 56 |      | :26  |
|    | 2004 |      |
| 56 |      | :27  |
|    | 2004 |      |
| 57 |      | :28  |
|    | 2004 |      |

57

:29

2004

58

:30

2004

58

:31

2004

59

:32

2004



|    |      |    |
|----|------|----|
| 23 |      | :1 |
|    | 2004 |    |
| 24 |      | :2 |
|    | 2004 |    |
| 24 |      | :3 |
|    | 2004 |    |
| 25 |      | :4 |
|    | 2004 |    |
| 26 |      | :5 |
|    | 2004 |    |
| 27 |      | :6 |
|    | 2004 |    |



84.4

76.3

160.7

%92.6

%95.6

%96.6

%93.2

%68.7

%93.2

5.8

381

3.9

106

1.9

275

%49.0

%70.6

%29.4

%16.0

%7.7

%16.9

%26.2

%14.7

%64.2

53.3

159.8

62.9

47.6

8.6

0.2

1.0

112.0

%87.8

%67.3

2004/10/01      2004/05/01

)

(  
2004/06/10 وحتى 2004/03/20

:      **1.1**

2004

2004

:

- 
- 
- 
- 
- 
-



: 2.1

2004

:

:

:

:

:

:

:

:

:

:

:

.1

.2

.3

:

:

-

-

:( )

:( )

:



%85

%5

%10

(-)

(0)



1.3 :

:

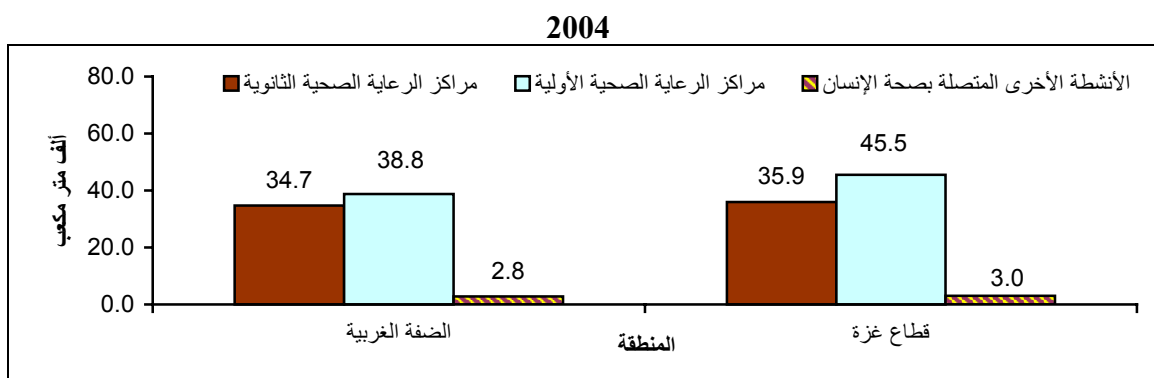
2004

84.4

76.3

160.7

1:



:

%93.2

%92.6

%95.6

%96.6

%100.0 %91.2

2.3 :

:

%68.7

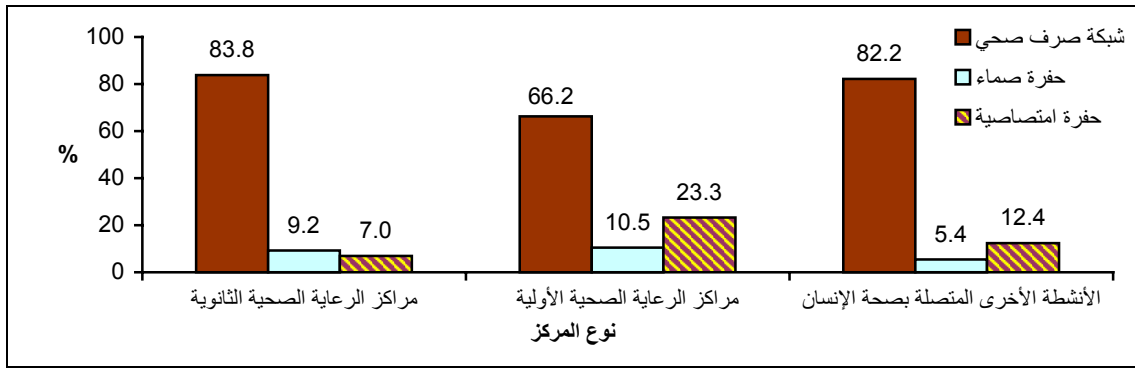
%21.4

%9.9

.2004

2004

:2



:

%93.2

%99.2

%99.3

:

3.3

:

5.8

380.9

3.9 106.1

2.3 218.2

1.9 274.8

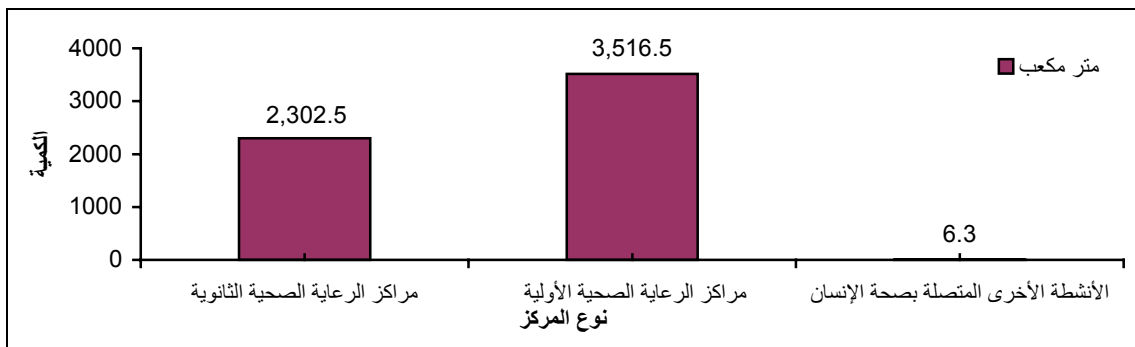
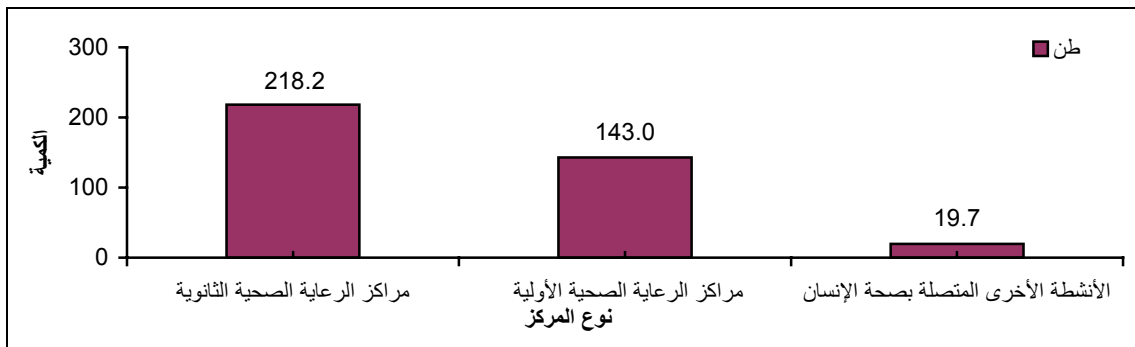
1.1 65.2

1.2 153.0

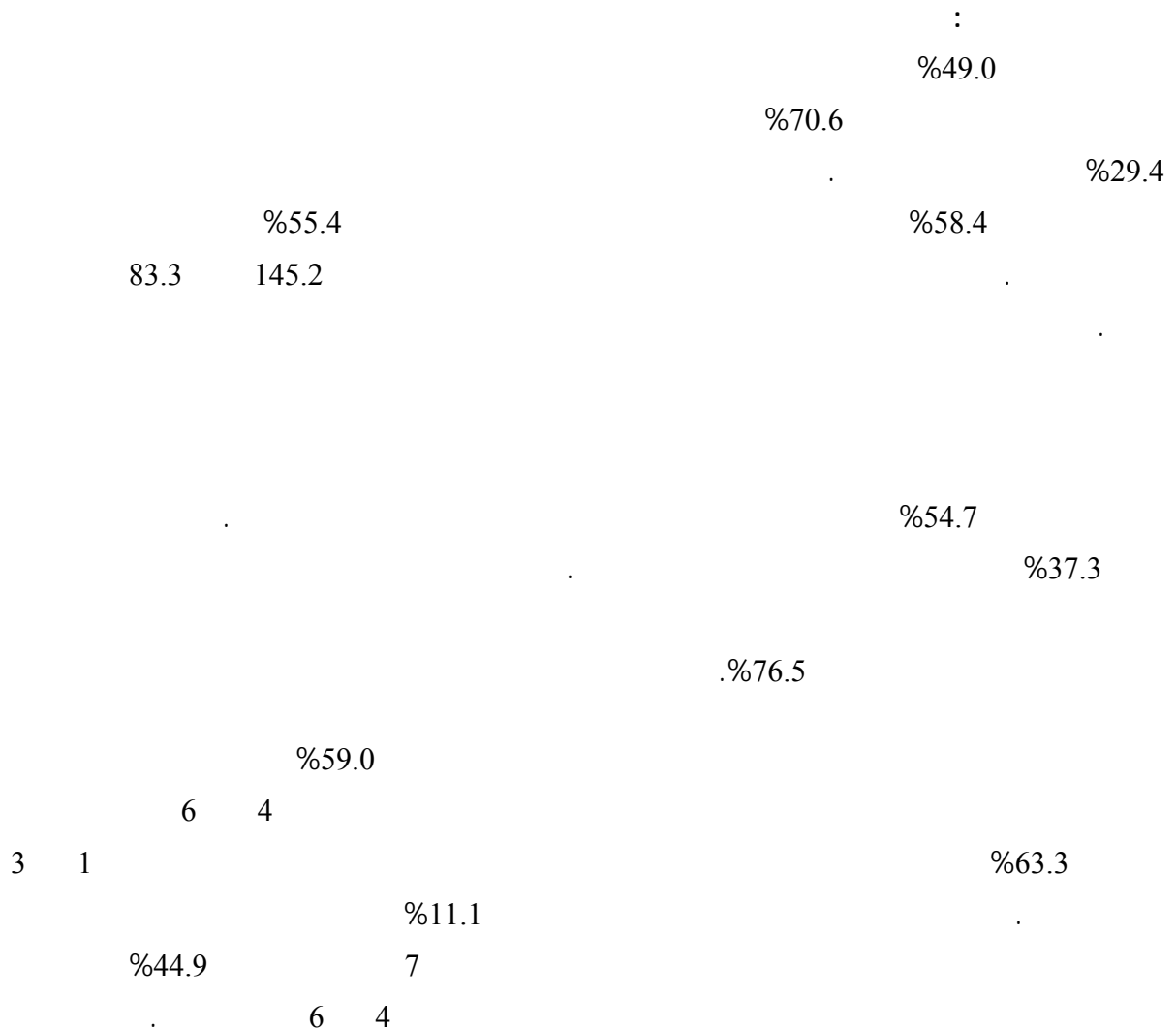
2004

\*

:3

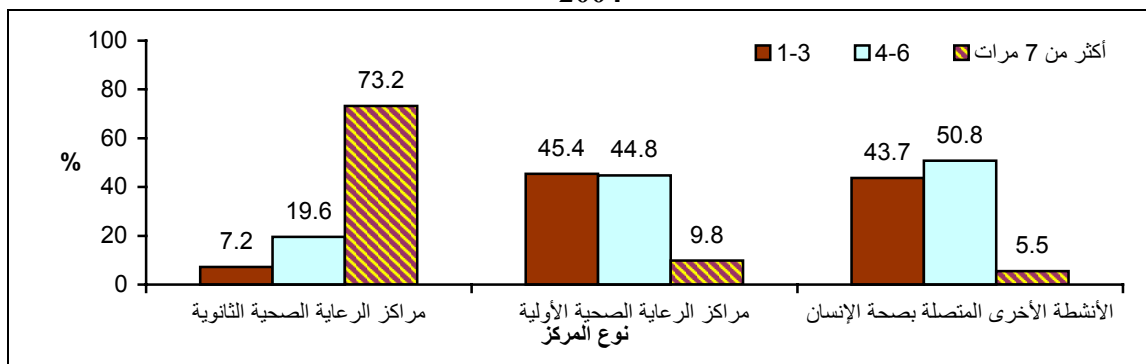


\*



:4

2004



:

%96.7

%1.5

%1.1

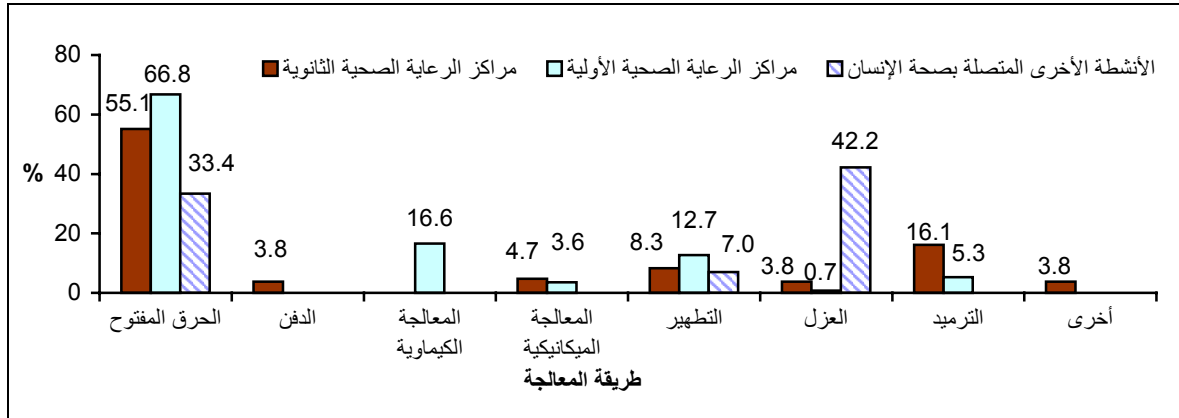
%97.0



%2.2  
 %96.3  
 :  
 %16.0  
 %7.7  
 %16.9  
 %26.2  
 %64.2  
 %14.7  
 %83.0  
 %8.3

2004

:5



159.8    62.9  
 47.6    8.6  
 112.0    53.3  
 0.2    1.0

%9.7  
 %3.9  
 %61.7  
 %5.6  
 %19.1  
 %86.0  
 %83.1  
 %11.5  
 %84.7

%53.7

%34.0

3

6 4

:

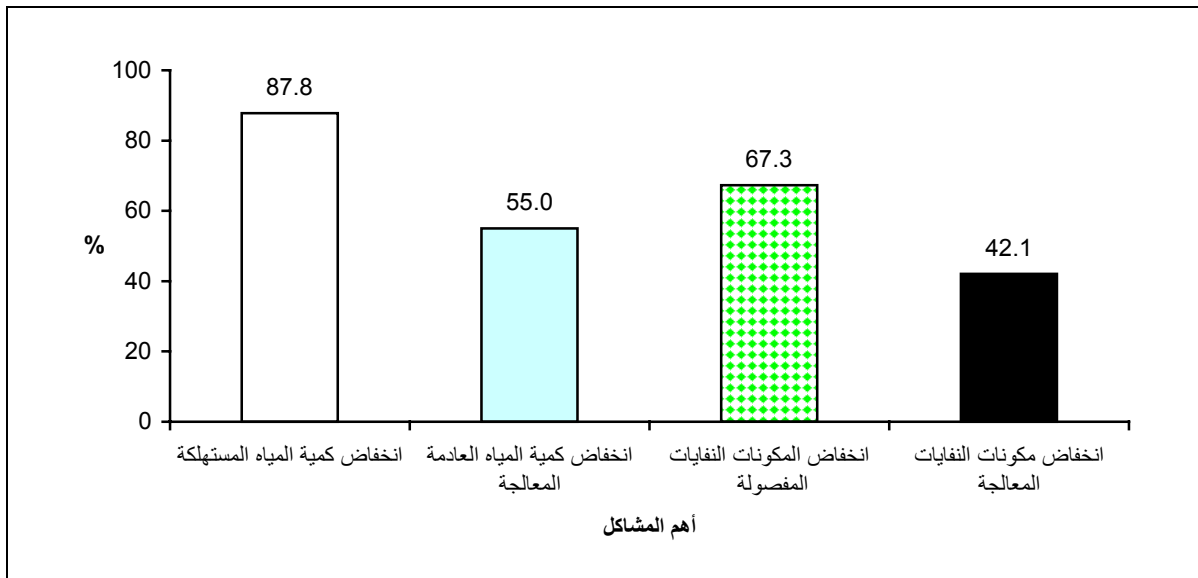
4.3

%87.8

%67.3

:6

2004





: **1.4**

2001

2001 2000

:

2003

: **2.4**

:

:

.(

)

.1

)

.2

.(

.3

:  
 :  
 : .1  
 1997 : .2  
 .2002  
 :  
 285  
 76 165 44  
 :  
 :  
 (1 )  
 )  
 .(  
 : **3.4**  
 .  
 .  
 2004  
 2004  
 2004  
 .2004/10/01 2004/05/01

:

:

.1

:

.2

:

4.4

:

Microsoft Access

:

.(User-Friendly)

.SPSS

- 
- 
- 
- 
- 
-



( )

:

: 1.5

حساب الأوزان:

حساب التباين:

Ultimate Cluster

CENVAR

: 2.5



.1

.2

|   |       |       |     |
|---|-------|-------|-----|
| : |       | .1997 | .1  |
| - | .67   |       |     |
|   |       | .1994 | .2  |
|   |       |       |     |
| . |       | .1999 | .3  |
|   |       | .1996 | .4  |
|   |       |       |     |
| . |       | :2000 | .5  |
| : |       | .2002 | .6  |
|   |       |       |     |
| . | :     | .2002 | .7  |
|   |       |       |     |
| . | :2003 | .2003 | .8  |
|   |       |       |     |
| - | .     | :2003 | .9  |
|   |       |       |     |
| - | .     | :2004 | .10 |

# Tables

**Table1: Main Selected Indicators about the Activity of the Health Care Center in the Palestinian Territory from Environmental Sides for the Years 2003 and 2004**

| Indicator  | 2004           | 2003           |                      |
|--|----------------|----------------|----------------------|
| <b>Estimated Monthly Quantity of Water Consumed (1000 m3)</b>                      | <b>160.7</b>   | <b>141.3</b>   | ( <sup>3</sup> 1000) |
| <b>Percent Distribution of Health Care Centers by Means of obtaining water</b>     |                |                |                      |
| Water network  | 93.2           | 87.3           |                      |
| Water tanks  | 4.4            | 6.3            |                      |
| Collection water well  | 2.3            | 6.0            |                      |
| Others   | 0.1            | 0.4            |                      |
| <b>Percent Distribution of Health Care Centers by Wastewater disposal method</b>   |                |                |                      |
| Wastewater network   | 68.7           | 65.9           |                      |
| Tight cesspit  | 9.9            | 8.6            |                      |
| Porous cesspit   | 21.4           | 25.5           |                      |
| <b>Monthly Quantity of Solid Waste Produced Estimated by Ton</b>                   | <b>380.9</b>   | <b>512.6</b>   |                      |
| <b>Monthly Quantity of Solid Waste Produced Estimated by Cubic meter</b>           | <b>5,825.3</b> | <b>4,011.1</b> |                      |
| <b>Percent of Health Care Centers which Separate Solid Waste</b>                   | <b>49.0</b>    | <b>43.6</b>    |                      |
| <b>Percent Distribution of Health Care Centers by Doer of Solid Waste Disposal</b> |                |                |                      |
| The health care center   | 11.5           | 18.9           |                      |
| Local Authority  | 83.1           | 77.6           |                      |
| Private contractor   | 0.1            | 1.8            |                      |
| UNRWA  | 1.7            | 0.6            |                      |
| Others   | 3.6            | 1.1            |                      |

2004

**Table 2: Estimated Monthly Quantity of Water Consumed in the Palestinian Territory from Health Care Center by Type of Health Care Center and Region, 2004**

Units in thousand cubic meter/month

| Region                       | Quantity of consumed water by type of health care center |                               |                            |                              |
|------------------------------|--|-------------------------------|----------------------------|------------------------------|
|                              | Total  | Other human health activities | Primary health care center | Secondary health care center |
| <b>Palestinian Territory</b> | <b>160.7</b>   | <b>5.8</b>                    | <b>84.3</b>                | <b>70.6</b>                  |
| <b>West Bank</b>             | <b>76.3</b>  | <b>2.8</b>                    | <b>38.8</b>                | <b>34.7</b>                  |
| North of West Bank           | 20.8   | 1.1                           | 11.2                       | 8.5                          |
| Middle of West Bank          | 31.1   | 0.7                           | 17.8                       | 12.6                         |
| South of West Bank           | 24.4   | 1.0                           | 9.8                        | 13.6                         |
| <b>Gaza Strip</b>            | <b>84.4</b>  | <b>3.0</b>                    | <b>45.5</b>                | <b>35.9</b>                  |

2004

**Table 3: Percent Distribution of Health Care Center in the Palestinian Territory by Means of Obtaining Water, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Means of obtaining water |            |                       |             |               |
|---------------------------------------|--------------------------|------------|-----------------------|-------------|---------------|
|                                       | Total                    | Others     | Collection water well | Water tanks | Water network |
| <b>Palestinian Territory</b>          | <b>100</b>               | <b>0.1</b> | <b>2.3</b>            | <b>4.4</b>  | <b>93.2</b>   |
| Secondary health care center          | 100                      | 0.0        | 2.2                   | 2.2         | 95.6          |
| Primary health care center            | 100                      | 0.1        | 2.4                   | 4.9         | 92.6          |
| Other human health activities         | 100                      | 0.0        | 1.8                   | 1.6         | 96.6          |
| <b>West Bank</b>                      | <b>100</b>               | <b>0.1</b> | <b>3.0</b>            | <b>5.7</b>  | <b>91.2</b>   |
| Secondary health care center          | 100                      | 0.0        | 2.8                   | 2.9         | 94.3          |
| Primary health care center            | 100                      | 0.2        | 3.1                   | 6.2         | 90.5          |
| Other human health activities         | 100                      | 0.0        | 2.5                   | 2.3         | 95.2          |
| <b>Gaza Strip</b>                     | <b>100</b>               | <b>0.0</b> | <b>0.0</b>            | <b>0.0</b>  | <b>100.0</b>  |
| Secondary health care center          | 100                      | 0.0        | 0.0                   | 0.0         | 100.0         |
| Primary health care center            | 100                      | 0.0        | 0.0                   | 0.0         | 100.0         |
| Other human health activities         | 100                      | 0.0        | 0.0                   | 0.0         | 100.0         |

2004

**Table 4: Percent Distribution of Health Care Center in the Palestinian Territory by Wastewater Disposal Method, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Wastewater disposal method |                |               |                    |
|---------------------------------------|----------------------------|----------------|---------------|--------------------|
|                                       | Total                      | Porous cesspit | Tight cesspit | Wastewater network |
| <b>Palestinian Territory</b>          | <b>100</b>                 | <b>21.4</b>    | <b>9.9</b>    | <b>68.7</b>        |
| Secondary health care center          | 100                        | 7.0            | 9.2           | 83.8               |
| Primary health care center            | 100                        | 23.3           | 10.5          | 66.2               |
| Other human health activities         | 100                        | 12.4           | 5.4           | 82.2               |
| <b>West Bank</b>                      | <b>100</b>                 | <b>22.4</b>    | <b>12.3</b>   | <b>65.3</b>        |
| Secondary health care center          | 100                        | 6.2            | 5.9           | 87.9               |
| Primary health care center            | 100                        | 24.3           | 13.2          | 62.5               |
| Other human health activities         | 100                        | 12.8           | 7.5           | 79.7               |
| <b>Gaza Strip</b>                     | <b>100</b>                 | <b>18.2</b>    | <b>1.8</b>    | <b>80.0</b>        |
| Secondary health care center          | 100                        | 9.4            | 19.8          | 70.8               |
| Primary health care center            | 100                        | 19.8           | 1.4           | 78.8               |
| Other human health activities         | 100                        | 11.1           | 0.0           | 88.9               |

2004

**Table 5: Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Wastewater Treatment, Method of Treatment, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Wastewater treatment method |                      |                    |                      | Existence of wastewater treatment |
|---------------------------------------|-----------------------------|----------------------|--------------------|----------------------|-----------------------------------|
|                                       | Total                       | Biological treatment | Chemical treatment | Mechanical treatment |                                   |
| <b>Palestinian Territory</b>          | <b>100</b>                  | <b>31.8</b>          | <b>18.4</b>        | <b>49.8</b>          | <b>0.9</b>                        |
| Secondary health care center          | 100                         | 0.0                  | 14.8               | 85.2                 | 6.8                               |
| Primary health care center            | 100                         | 50.3                 | 23.3               | 26.4                 | 0.7                               |
| Other human health activities         | 100                         | 0.0                  | 0.0                | 100.0                | 0.8                               |
| <b>West Bank</b>                      | <b>100</b>                  | <b>33.0</b>          | <b>19.1</b>        | <b>47.9</b>          | <b>1.1</b>                        |
| Secondary health care center          | 100                         | 0.0                  | 17.3               | 82.7                 | 7.6                               |
| Primary health care center            | 100                         | 50.3                 | 23.3               | 26.4                 | 0.9                               |
| Other human health activities         | 100                         | 0.0                  | 0.0                | 100.0                | 1.1                               |
| <b>Gaza Strip</b>                     | <b>100</b>                  | <b>0.0</b>           | <b>0.0</b>         | <b>100.0</b>         | <b>0.1</b>                        |
| Secondary health care center          | 100                         | 0.0                  | 0.0                | 100.0                | 4.2                               |
| Primary health care center            | -                           | -                    | -                  | -                    | 0.0                               |
| Other human health activities         | -                           | -                    | -                  | -                    | 0.0                               |

2004

**Table 6: Estimated Monthly Quantity of Solid Waste Produced from Health Care Center in the Palestinian Territory by Type of Health Care Center and Region, 2004**

| Region and type of health care center | Monthly Estimated Quantity |                   |
|---------------------------------------|----------------------------|-------------------|
|                                       | Quantities by cubic meter  | Quantities by Ton |
| <b>Palestinian Territory</b>          | <b>5,825.3</b>             | <b>380.9</b>      |
| Secondary health care center          | 2,302.5                    | 218.2             |
| Primary health care center            | 3,516.5                    | 143.0             |
| Other human health activities         | 6.3                        | 19.7              |
| <b>West Bank</b>                      | <b>1,939.4</b>             | <b>274.8</b>      |
| Secondary health care center          | 1,235.0                    | 153.0             |
| Primary health care center            | 698.1                      | 108.4             |
| Other human health activities         | 6.3                        | 13.4              |
| <b>Gaza Strip</b>                     | <b>3,885.9</b>             | <b>106.1</b>      |
| Secondary health care center          | 1,067.5                    | 65.2              |
| Primary health care center            | 2,818.4                    | 34.6              |
| Other human health activities         | 0.0                        | 6.3               |

2004

**Table 7: Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Separation and Type of Separation, Region and Type of Health Care Center, 2004**

| Region and type of health care center | Type of separation |             |             | Existence of separation |
|---------------------------------------|--------------------|-------------|-------------|-------------------------|
|                                       | Total              | Partially   | Completely  |                         |
| <b>Palestinian Territory</b>          | <b>100</b>         | <b>70.6</b> | <b>29.4</b> | <b>49.0</b>             |
| Secondary health care center          | 100                | 76.4        | 23.6        | 68.2                    |
| Primary health care center            | 100                | 69.6        | 30.4        | 51.1                    |
| Other human health activities         | 100                | 79.5        | 20.5        | 29.6                    |
| <b>West Bank</b>                      | <b>100</b>         | <b>82.7</b> | <b>17.3</b> | <b>45.2</b>             |
| Secondary health care center          | 100                | 73.7        | 26.3        | 69.0                    |
| Primary health care center            | 100                | 81.7        | 18.3        | 46.4                    |
| Other human health activities         | 100                | 100.0       | 0.0         | 30.2                    |
| <b>Gaza Strip</b>                     | <b>100</b>         | <b>40.8</b> | <b>59.2</b> | <b>61.6</b>             |
| Secondary health care center          | 100                | 85.7        | 14.3        | 65.6                    |
| Primary health care center            | 100                | 40.3        | 59.7        | 67.8                    |
| Other human health activities         | 100                | 24.9        | 75.1        | 28.1                    |

**Table 8: Percentage of Health Care Center in the Palestinian Territory by Type of Separated Waste, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Type of separated waste |             |                   |   |                  |               |  |
|--|-------------------------|-------------|-------------------|---|------------------|---------------|--|
|  | Other                   | Sharp waste | Radioactive waste | Chemical, Pharmaceutical and wastes non radioactive | Infectious waste | General waste |  |
| <b>Palestinian Territory</b>             | <b>1.6</b>              | <b>42.6</b> | <b>2.6</b>        | <b>13.6</b>   | <b>55.4</b>      | <b>58.4</b>   |  |
| Secondary health care center             | 14.8                    | 62.3        | 12.1              | 50.9  | 70.7             | 57.1          |  |
| Primary health care center               | 0.7                     | 44.3        | 1.7               | 11.0  | 54.0             | 59.2          |  |
| Other human health activities            | 0.0                     | 8.6         | 8.8               | 23.4  | 64.2             | 49.6          |  |
| <b>West Bank</b>                         | <b>1.8</b>              | <b>47.1</b> | <b>2.8</b>        | <b>15.8</b>   | <b>63.5</b>      | <b>49.1</b>   |  |
| Secondary health care center             | 18.6                    | 55.8        | 11.4              | 53.3  | 70.0             | 51.9          |  |
| Primary health care center               | 0.8                     | 50.1        | 2.3               | 12.8  | 62.2             | 49.7          |  |
| Other human health activities            | 0.0                     | 3.8         | 4.0               | 29.9  | 75.3             | 39.2          |  |
| <b>Gaza Strip</b>                        | <b>1.0</b>              | <b>30.1</b> | <b>2.1</b>        | <b>7.4</b>  | <b>32.9</b>      | <b>81.3</b>   |  |
| Secondary health care center             | 7.8                     | 84.1        | 14.3              | 42.9  | 73.0             | 74.6          |  |
| Primary health care center               | 0.0                     | 28.2        | 0.0               | 6.1   | 31.3             | 82.0          |  |
| Other human health activities            | 0.0                     | 23.1        | 23.1              | 3.8   | 30.7             | 75.1          |  |



2004

**Table 9: Estimated Monthly Quantity of Separated Health Care Waste Produced from in the Palestinian Territory by Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Monthly estimated quantity |                   |
|---------------------------------------|----------------------------|-------------------|
|                                       | Quantities by cubic meter  | Quantities by Ton |
| <b>Palestinian Territory</b>          | <b>83.3</b>                | <b>145.2</b>      |
| Secondary health care center          | 15.8                       | 74.3              |
| Primary health care center            | 67.4                       | 65.8              |
| Other human health activities         | 0.1                        | 5.1               |
| <b>West Bank</b>                      | <b>38.4</b>                | <b>66.2</b>       |
| Secondary health care center          | 0.2                        | 24.2              |
| Primary health care center            | 38.2                       | 40.0              |
| Other human health activities         | 0.0                        | 2.0               |
| <b>Gaza Strip</b>                     | <b>44.9</b>                | <b>79.0</b>       |
| Secondary health care center          | 15.7                       | 50.1              |
| Primary health care center            | 29.2                       | 25.8              |
| Other human health activities         | 0.0                        | 3.1               |

:10

2004

**Table 10: Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where General waste Put in, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Package method |               |             |              |              |             |
|---------------------------------------|----------------|---------------|-------------|--------------|--------------|-------------|
|                                       | Total          | Plastic boxes | Metal boxes | Carton boxes | Special bags | Nylon bags  |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>4.6</b>    | <b>24.2</b> | <b>1.2</b>   | <b>15.3</b>  | <b>54.7</b> |
| Secondary health care center          | 100            | 10.5          | 36.6        | 3.2          | 29.2         | 20.5        |
| Primary health care center            | 100            | 4.6           | 25.4        | 1.1          | 13.9         | 55.0        |
| Other human health activities         | 100            | 0.0           | 0.0         | 0.0          | 26.4         | 73.6        |
| <b>West Bank</b>                      | <b>100</b>     | <b>7.4</b>    | <b>38.0</b> | <b>1.9</b>   | <b>23.6</b>  | <b>29.1</b> |
| Secondary health care center          | 100            | 15.2          | 36.8        | 4.6          | 21.3         | 22.1        |
| Primary health care center            | 100            | 7.5           | 40.5        | 1.9          | 23.4         | 26.7        |
| Other human health activities         | 100            | 0.0           | 0.0         | 0.0          | 27.4         | 72.6        |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>0.4</b>    | <b>4.0</b>  | <b>0.0</b>   | <b>3.1</b>   | <b>92.5</b> |
| Secondary health care center          | 100            | 0.0           | 36.2        | 0.0          | 46.8         | 17.0        |
| Primary health care center            | 100            | 0.5           | 3.1         | 0.0          | 0.0          | 96.4        |
| Other human health activities         | 100            | 0.0           | 0.0         | 0.0          | 25.0         | 75.0        |

2004

**Table 11: Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Infectious waste Put in, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Package method |               |             |              |              |             |
|---------------------------------------|----------------|---------------|-------------|--------------|--------------|-------------|
|                                       | Total          | Plastic boxes | Metal boxes | Carton boxes | Special bags | Nylon bags  |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>37.3</b>   | <b>18.8</b> | <b>22.1</b>  | <b>12.3</b>  | <b>9.5</b>  |
| Secondary health care center          | 100            | 38.0          | 32.6        | 17.5         | 9.8          | 2.1         |
| Primary health care center            | 100            | 37.2          | 18.9        | 24.5         | 11.7         | 7.7         |
| Other human health activities         | 100            | 37.9          | 7.6         | 0.0          | 21.0         | 33.5        |
| <b>West Bank</b>                      | <b>100</b>     | <b>37.3</b>   | <b>20.0</b> | <b>22.3</b>  | <b>11.4</b>  | <b>9.0</b>  |
| Secondary health care center          | 100            | 44.4          | 25.3        | 14.8         | 12.8         | 2.7         |
| Primary health care center            | 100            | 36.3          | 21.0        | 25.0         | 11.1         | 6.6         |
| Other human health activities         | 100            | 43.0          | 7.0         | 0.0          | 12.0         | 38.0        |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>37.2</b>   | <b>11.5</b> | <b>20.9</b>  | <b>18.2</b>  | <b>12.2</b> |
| Secondary health care center          | 100            | 17.4          | 56.5        | 26.1         | 0.0          | 0.0         |
| Primary health care center            | 100            | 42.5          | 6.3         | 22.0         | 14.6         | 14.6        |
| Other human health activities         | 100            | 0.0           | 12.3        | 0.0          | 87.7         | 0.0         |

2004

**Table 12: Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Sharp waste Put in, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Package method |            |               |             |              |              |            |
|---------------------------------------|----------------|------------|---------------|-------------|--------------|--------------|------------|
|                                       | Total          | Other      | Plastic boxes | Metal boxes | Carton boxes | Special bags | Nylon bags |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>2.0</b> | <b>24.0</b>   | <b>7.9</b>  | <b>58.9</b>  | <b>4.3</b>   | <b>2.9</b> |
| Secondary health care center          | 100            | 0.0        | 41.2          | 17.6        | 36.4         | 4.7          | 0.1        |
| Primary health care center            | 100            | 2.1        | 22.9          | 7.4         | 61.4         | 4.1          | 2.1        |
| Other human health activities         | 100            | 0.0        | 11.0          | 0.0         | 0.0          | 22.0         | 67.0       |
| <b>West Bank</b>                      | <b>100</b>     | <b>2.4</b> | <b>27.6</b>   | <b>5.3</b>  | <b>57.4</b>  | <b>4.9</b>   | <b>2.4</b> |
| Secondary health care center          | 100            | 0.0        | 52.3          | 17.9        | 22.9         | 6.9          | 0.0        |
| Primary health care center            | 100            | 2.5        | 26.2          | 4.5         | 59.8         | 4.4          | 2.6        |
| Other human health activities         | 100            | 0.0        | 33.3          | 0.0         | 0.0          | 66.7         | 0.0        |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>0.0</b> | <b>7.9</b>    | <b>19.9</b> | <b>65.7</b>  | <b>1.4</b>   | <b>5.1</b> |
| Secondary health care center          | 100            | 0.0        | 17.0          | 17.0        | 66.0         | 0.0          | 0.0        |
| Primary health care center            | 100            | 0.0        | 7.2           | 21.5        | 69.6         | 1.7          | 0.0        |
| Other human health activities         | 100            | 0.0        | 0.0           | 0.0         | 0.0          | 0.0          | 100.0      |

**Table 13: Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Non Separated Solid Waste Put in, Region, and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Package method |            |                  |                |                 |                 |               |
|--|----------------|------------|------------------|----------------|-----------------|-----------------|---------------|
|  | Total          | Other      | Plastic<br>boxes | Metal<br>boxes | Carton<br>boxes | Special<br>bags | Nylon<br>bags |
| <b>Palestinian Territory</b>             | <b>100</b>     | <b>1.4</b> | <b>4.0</b>       | <b>0.1</b>     | <b>1.8</b>      | <b>16.2</b>     | <b>76.5</b>   |
| Secondary health care center             | 100            | 1.5        | 4.7              | 1.2            | 0.0             | 19.3            | 73.3          |
| Primary health care center               | 100            | 1.7        | 3.3              | 0.1            | 2.1             | 15.9            | 76.9          |
| Other human health activities            | 100            | 0.3        | 8.0              | 0.0            | 0.0             | 17.2            | 74.5          |
| <b>West Bank</b>                         | <b>100</b>     | <b>1.5</b> | <b>4.6</b>       | <b>0.1</b>     | <b>2.0</b>      | <b>15.4</b>     | <b>76.4</b>   |
| Secondary health care center             | 100            | 0.0        | 4.8              | 1.6            | 0.0             | 18.0            | 75.6          |
| Primary health care center               | 100            | 1.9        | 3.7              | 0.0            | 2.4             | 15.2            | 76.8          |
| Other human health activities            | 100            | 0.0        | 10.6             | 0.0            | 0.0             | 16.0            | 73.4          |
| <b>Gaza Strip</b>                        | <b>100</b>     | <b>1.2</b> | <b>0.9</b>       | <b>0.0</b>     | <b>0.5</b>      | <b>20.2</b>     | <b>77.2</b>   |
| Secondary health care center             | 100            | 5.7        | 4.6              | 0.0            | 0.0             | 23.0            | 66.7          |
| Primary health care center               | 100            | 0.9        | 1.0              | 0.0            | 0.6             | 19.8            | 77.7          |
| Other human health activities            | 100            | 1.1        | 0.0              | 0.0            | 0.0             | 21.1            | 77.8          |

**Table 14: Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of General waste, Infectious waste and Sharp waste, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Type of waste and Transportation method |              |                  |             |                  |              |                  |             |               |              |                  |             |
|---------------------------------------|---|--------------|------------------|-------------|------------------|--------------|------------------|-------------|---------------|--------------|------------------|-------------|
|                                       | Sharp waste                             |              |                  |             | Infectious waste |              |                  |             | General waste |              |                  |             |
|                                       | Total                                   | Both methods | Special carriage | Manually    | Total            | Both methods | Special carriage | Manually    | Total         | Both methods | Special carriage | Manually    |
| <b>Palestinian Territory</b>          | <b>100</b>                              | <b>4.1</b>   | <b>0.8</b>       | <b>95.1</b> | <b>100</b>       | <b>1.9</b>   | <b>1.1</b>       | <b>97.0</b> | <b>100</b>    | <b>1.8</b>   | <b>1.5</b>       | <b>96.7</b> |
| Secondary health care center          | 100                                     | 17.9         | 7.1              | 75.0        | 100              | 11.0         | 8.2              | 80.8        | 100           | 20.1         | 7.6              | 72.3        |
| Primary health care center            | 100                                     | 3.2          | 0.4              | 96.4        | 100              | 1.0          | 0.5              | 98.5        | 100           | 1.0          | 0.5              | 98.5        |
| Other human health activities         | 100                                     | 0.0          | 0.0              | 100.0       | 100              | 4.6          | 1.5              | 93.9        | 100           | 0.0          | 11.8             | 88.2        |
| <b>West Bank</b>                      | <b>100</b>                              | <b>4.3</b>   | <b>0.8</b>       | <b>94.9</b> | <b>100</b>       | <b>1.8</b>   | <b>1.0</b>       | <b>97.2</b> | <b>100</b>    | <b>2.6</b>   | <b>2.1</b>       | <b>95.3</b> |
| Secondary health care center          | 100                                     | 18.3         | 6.9              | 74.8        | 100              | 11.6         | 8.1              | 80.3        | 100           | 20.6         | 3.6              | 75.8        |
| Primary health care center            | 100                                     | 3.6          | 0.4              | 96.0        | 100              | 0.9          | 0.6              | 98.5        | 100           | 1.8          | 0.8              | 97.4        |
| Other human health activities         | 100                                     | 0.0          | 0.0              | 100.0       | 100              | 5.3          | 0.0              | 94.7        | 100           | 0.0          | 21.0             | 79.0        |
| <b>Gaza Strip</b>                     | <b>100</b>                              | <b>3.2</b>   | <b>0.8</b>       | <b>96.0</b> | <b>100</b>       | <b>2.2</b>   | <b>1.7</b>       | <b>96.1</b> | <b>100</b>    | <b>0.6</b>   | <b>0.5</b>       | <b>98.9</b> |
| Secondary health care center          | 100                                     | 17.0         | 7.5              | 75.5        | 100              | 8.7          | 8.7              | 82.6        | 100           | 19.1         | 17.1             | 63.8        |
| Primary health care center            | 100                                     | 1.6          | 0.0              | 98.4        | 100              | 1.6          | 0.0              | 98.4        | 100           | 0.0          | 0.0              | 100.0       |
| Other human health activities         | 100                                     | 0.0          | 0.0              | 100.0       | 100              | 0.0          | 12.3             | 87.7        | 100           | 0.0          | 0.0              | 100.0       |

2004

**Table 15: Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of Non Separated Waste, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care<br>center | Transportation Method |                 |                     |             |
|---|-----------------------|-----------------|---------------------|-------------|
|   | Total                 | Both<br>methods | Special<br>carriage | Manually    |
| <b>Palestinian Territory</b>                | <b>100</b>            | <b>1.5</b>      | <b>2.2</b>          | <b>96.3</b> |
| Secondary health care center                | 100                   | 16.3            | 14.4                | 69.3        |
| Primary health care center                  | 100                   | 1.2             | 2.1                 | 96.7        |
| Other human health activities               | 100                   | 0.0             | 0.3                 | 99.7        |
| <b>West Bank</b>                            | <b>100</b>            | <b>1.5</b>      | <b>2.3</b>          | <b>96.2</b> |
| Secondary health care center                | 100                   | 16.4            | 10.6                | 73.0        |
| Primary health care center                  | 100                   | 1.3             | 2.4                 | 96.3        |
| Other human health activities               | 100                   | 0.0             | 0.0                 | 100.0       |
| <b>Gaza Strip</b>                           | <b>100</b>            | <b>1.1</b>      | <b>2.0</b>          | <b>96.9</b> |
| Secondary health care center                | 100                   | 16.1            | 25.3                | 58.6        |
| Primary health care center                  | 100                   | 0.4             | 0.9                 | 98.7        |
| Other human health activities               | 100                   | 0.0             | 1.1                 | 98.9        |

**Table 16: Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of General waste, Infectious waste and Sharp waste Collection, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care<br>center | Type of waste and Periodicity of Collection |                              |                     |                     |                  |                              |                     |                     |               |                              |                     |                     |
|---|---|------------------------------|---------------------|---------------------|------------------|------------------------------|---------------------|---------------------|---------------|------------------------------|---------------------|---------------------|
|   | Sharp waste                                 |                              |                     |                     | waste Infectious |                              |                     |                     | General waste |                              |                     |                     |
|   | Total                                       | 7<br>More<br>than 7<br>times | 6-4<br>4-6<br>times | 3-1<br>1-3<br>times | Total            | 7<br>More<br>than 7<br>times | 6-4<br>4-6<br>times | 3-1<br>1-3<br>times | Total         | 7<br>More<br>than 7<br>times | 6-4<br>4-6<br>times | 3-1<br>1-3<br>times |
| <b>Palestinian Territory</b>                | <b>100</b>                                  | <b>6.3</b>                   | <b>23.3</b>         | <b>70.4</b>         | <b>100</b>       | <b>5.2</b>                   | <b>31.5</b>         | <b>63.3</b>         | <b>100</b>    | <b>5.6</b>                   | <b>59.0</b>         | <b>35.4</b>         |
| Secondary health care center                | 100   | 47.4                         | 7.3                 | 45.3                | 100              | 39.5                         | 10.5                | 50.0                | 100           | 54.8                         | 26.1                | 19.1                |
| Primary health care center                  | 100   | 3.3                          | 24.6                | 72.1                | 100              | 3.2                          | 32.8                | 64.0                | 100           | 3.6                          | 59.8                | 36.6                |
| Other human health activities               | 100   | 11.0                         | 11.0                | 78.0                | 100              | 1.8                          | 32.5                | 65.7                | 100           | 1.8                          | 69.0                | 29.2                |
| <b>West Bank</b>                            | <b>100</b>                                  | <b>3.5</b>                   | <b>20.6</b>         | <b>75.9</b>         | <b>100</b>       | <b>3.9</b>                   | <b>26.7</b>         | <b>69.4</b>         | <b>100</b>    | <b>7.6</b>                   | <b>33.1</b>         | <b>59.3</b>         |
| Secondary health care center                | 100   | 45.7                         | 3.6                 | 50.7                | 100              | 31.3                         | 8.3                 | 60.4                | 100           | 49.9                         | 26.3                | 23.8                |
| Primary health care center                  | 100   | 0.9                          | 21.5                | 77.6                | 100              | 2.4                          | 28.1                | 69.5                | 100           | 5.4                          | 32.8                | 61.8                |
| Other human health activities               | 100   | 33.4                         | 33.3                | 33.3                | 100              | 2.1                          | 22.9                | 75.0                | 100           | 3.2                          | 44.6                | 52.2                |
| <b>Gaza Strip</b>                           | <b>100</b>                                  | <b>18.1</b>                  | <b>35.3</b>         | <b>46.6</b>         | <b>100</b>       | <b>13.0</b>                  | <b>58.6</b>         | <b>28.4</b>         | <b>100</b>    | <b>2.9</b>                   | <b>95.8</b>         | <b>1.3</b>          |
| Secondary health care center                | 100   | 50.9                         | 15.1                | 34.0                | 100              | 65.2                         | 17.4                | 17.4                | 100           | 66.0                         | 25.5                | 8.5                 |
| Primary health care center                  | 100   | 15.0                         | 40.0                | 45.0                | 100              | 8.2                          | 60.9                | 30.9                | 100           | 1.0                          | 97.9                | 1.1                 |
| Other human health activities               | 100   | 0.0                          | 0.0                 | 100.0               | 100              | 0.0                          | 87.7                | 12.3                | 100           | 0.0                          | 100.0               | 0.0                 |

2004

**Table 17: Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of Non-Separated Solid Waste Collection, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Periodicity |                           |                     |                     |
|--|-------------|---------------------------|---------------------|---------------------|
|  | Total       | 7<br>More than<br>7 times | 6-4<br>4-6<br>times | 3-1<br>1-3<br>times |
| <b>Palestinian Territory</b>             | <b>100</b>  | <b>11.1</b>               | <b>44.9</b>         | <b>44.0</b>         |
| Secondary health care center             | 100         | 73.2                      | 19.6                | 7.2                 |
| Primary health care center               | 100         | 9.8                       | 44.8                | 45.4                |
| Other human health activities            | 100         | 5.5                       | 50.8                | 43.7                |
| <b>West Bank</b>                         | <b>100</b>  | <b>9.5</b>                | <b>38.6</b>         | <b>51.9</b>         |
| Secondary health care center             | 100         | 74.3                      | 20.0                | 5.7                 |
| Primary health care center               | 100         | 8.2                       | 38.3                | 53.5                |
| Other human health activities            | 100         | 4.4                       | 44.4                | 51.2                |
| <b>Gaza Strip</b>                        | <b>100</b>  | <b>18.8</b>               | <b>75.7</b>         | <b>5.5</b>          |
| Secondary health care center             | 100         | 70.1                      | 18.4                | 11.5                |
| Primary health care center               | 100         | 18.3                      | 80.3                | 1.4                 |
| Other human health activities            | 100         | 8.9                       | 71.1                | 20.0                |

**Table 18: Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Waste Treatment, Type of Treatment, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Type of treatment |            |              |            |               |                      |                                  |                |              | Existence treatment |
|---------------------------------------|-------------------|------------|--------------|------------|---------------|----------------------|----------------------------------|----------------|--------------|---------------------|
|                                       | Total             | Other      | Incineration | Insulation | Disinfections | Mechanical treatment | الكيميائية<br>Chemical treatment | دفن<br>Burying | Open burning |                     |
| <b>Palestinian Territory</b>          | <b>100</b>        | <b>0.2</b> | <b>5.6</b>   | <b>3.3</b> | <b>8.3</b>    | <b>3.5</b>           | <b>14.7</b>                      | <b>0.2</b>     | <b>64.2</b>  | <b>16.0</b>         |
| Secondary health care center          | 100               | 3.8        | 16.1         | 3.8        | 12.7          | 4.7                  | 0.0                              | 3.8            | 55.1         | 26.2                |
| Primary health care center            | 100               | 0.0        | 5.4          | 0.6        | 7.0           | 3.6                  | 16.6                             | 0.0            | 66.8         | 16.9                |
| Other human health activities         | 100               | 0.0        | 0.0          | 42.2       | 24.4          | 0.0                  | 0.0                              | 0.0            | 33.4         | 7.7                 |
| <b>West Bank</b>                      | <b>100</b>        | <b>0.2</b> | <b>4.4</b>   | <b>3.4</b> | <b>8.1</b>    | <b>3.1</b>           | <b>15.5</b>                      | <b>0.2</b>     | <b>65.1</b>  | <b>19.8</b>         |
| Secondary health care center          | 100               | 5.3        | 0.0          | 5.3        | 7.1           | 0.0                  | 0.0                              | 5.3            | 77.0         | 24.5                |
| Primary health care center            | 100               | 0.0        | 4.9          | 0.7        | 7.2           | 3.4                  | 17.2                             | 0.0            | 66.6         | 20.9                |
| Other human health activities         | 100               | 0.0        | 0.1          | 43.6       | 21.8          | 0.0                  | 0.0                              | 0.0            | 34.5         | 10.4                |
| <b>Gaza Strip</b>                     | <b>100</b>        | <b>0.0</b> | <b>29.5</b>  | <b>0.0</b> | <b>12.1</b>   | <b>11.4</b>          | <b>0.0</b>                       | <b>0.0</b>     | <b>47.0</b>  | <b>3.3</b>          |
| Secondary health care center          | 100               | 0.0        | 56.6         | 0.0        | 26.7          | 16.7                 | 0.0                              | 0.0            | 0.0          | 31.9                |
| Primary health care center            | 100               | 0.0        | 19.0         | 0.0        | 0.0           | 9.6                  | 0.0                              | 0.0            | 71.4         | 2.7                 |
| Other human health activities         | 100               | 0.0        | 0.0          | 0.0        | 100.0         | 0.0                  | 0.0                              | 0.0            | 0.0          | 0.9                 |



2004

**Table 19: Estimated Monthly Quantity of Treated Health Care Waste Produced from in the Palestinian Territory by Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Monthly estimated<br>quantity |                   |
|--|-------------------------------|-------------------|
|  | Quantities by cubic<br>meter  | Quantities by Ton |
| <b>Palestinian Territory</b>             | <b>159.8</b>                  | <b>62.9</b>       |
| Secondary health care center             | 112.0                         | 53.3              |
| Primary health care center               | 47.6                          | 8.6               |
| Other human health activities            | 0.2                           | 1.0               |
| <b>West Bank</b>                         | <b>113.5</b>                  | <b>19.3</b>       |
| Secondary health care center             | 106.0                         | 10.1              |
| Primary health care center               | 7.3                           | 8.2               |
| Other human health activities            | 0.2                           | 1.0               |
| <b>Gaza Strip</b>                        | <b>46.3</b>                   | <b>43.6</b>       |
| Secondary health care center             | 6.0                           | 43.2              |
| Primary health care center               | 40.3                          | 0.4               |
| Other human health activities            | 0.0                           | 0.0               |

2004

**Table 20: Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Treatment, Doer of Treatment, Region and Type of Health Care Center, 2004**

| Region<br>and type of health care center | Doer of treatment |                        |                           | Existence<br>treatment |
|--|-------------------|------------------------|---------------------------|------------------------|
|  | Total             | Other<br>establishment | The health<br>care center |                        |
| <b>Palestinian Territory</b>             | <b>100</b>        | <b>17.0</b>            | <b>83.0</b>               | <b>16.0</b>            |
| Secondary health care center             | 100               | 34.4                   | 65.6                      | 26.2                   |
| Primary health care center               | 100               | 16.5                   | 83.5                      | 16.9                   |
| Other human health activities            | 100               | 10.2                   | 89.8                      | 7.7                    |
| <b>West Bank</b>                         | <b>100</b>        | <b>17.0</b>            | <b>83.0</b>               | <b>19.8</b>            |
| Secondary health care center             | 100               | 43.4                   | 56.6                      | 24.5                   |
| Primary health care center               | 100               | 16.4                   | 83.6                      | 20.9                   |
| Other human health activities            | 100               | 10.6                   | 89.4                      | 10.4                   |
| <b>Gaza Strip</b>                        | <b>100</b>        | <b>16.5</b>            | <b>83.5</b>               | <b>3.3</b>             |
| Secondary health care center             | 100               | 13.3                   | 86.7                      | 31.9                   |
| Primary health care center               | 100               | 19.0                   | 81.0                      | 2.7                    |
| Other human health activities            | 100               | 0.0                    | 100.0                     | 0.9                    |

**Table 21: Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Mean inside the Health Care Center, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Collection mean |                      |  |                                      |                                     |                                   |
|--|-----------------|----------------------|--|--------------------------------------|-------------------------------------|-----------------------------------|
|  | Total           | Without<br>container | Health care center<br>closed container | Health care center<br>open container | Local authority<br>closed container | Local authority<br>open container |
| <b>Palestinian Territory</b>             | <b>100</b>      | <b>19.1</b>          | <b>3.9</b>                             | <b>5.6</b>                           | <b>9.7</b>                          | <b>61.7</b>                       |
| Secondary health care center             | 100             | 1.0                  | 13.1                                   | 4.3                                  | 31.8                                | 49.8                              |
| Primary health care center               | 100             | 19.7                 | 3.1                                    | 6.2                                  | 9.6                                 | 61.4                              |
| Other human health activities            | 100             | 19.2                 | 7.5                                    | 1.5                                  | 4.8                                 | 67.0                              |
| <b>West Bank</b>                         | <b>100</b>      | <b>20.0</b>          | <b>3.8</b>                             | <b>5.3</b>                           | <b>10.4</b>                         | <b>60.5</b>                       |
| Secondary health care center             | 100             | 0.0                  | 15.9                                   | 4.4                                  | 36.2                                | 43.5                              |
| Primary health care center               | 100             | 21.2                 | 3.0                                    | 6.1                                  | 10.3                                | 59.4                              |
| Other human health activities            | 100             | 16.3                 | 5.6                                    | 0.0                                  | 4.6                                 | 73.5                              |
| <b>Gaza Strip</b>                        | <b>100</b>      | <b>16.0</b>          | <b>4.3</b>                             | <b>6.5</b>                           | <b>7.4</b>                          | <b>65.8</b>                       |
| Secondary health care center             | 100             | 4.2                  | 4.2                                    | 4.1                                  | 17.7                                | 69.8                              |
| Primary health care center               | 100             | 14.5                 | 2.8                                    | 6.8                                  | 7.5                                 | 68.4                              |
| Other human health activities            | 100             | 26.3                 | 12.3                                   | 5.3                                  | 5.2                                 | 50.9                              |

2004

**Table 22: Percent Distribution of Health Care Center in the Palestinian Territory by the Container Material Construction, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Container material<br>construction |            |             |             |
|--|------------------------------------|------------|-------------|-------------|
|  | Total                              | Others     | Plastic     | Metal       |
| <b>Palestinian Territory</b>             | <b>100</b>                         | <b>0.8</b> | <b>13.2</b> | <b>86.0</b> |
| Secondary health care center             | 100                                | 0.0        | 6.2         | 93.8        |
| Primary health care center               | 100                                | 0.7        | 12.8        | 86.5        |
| Other human health activities            | 100                                | 1.9        | 18.0        | 80.1        |
| <b>West Bank</b>                         | <b>100</b>                         | <b>0.8</b> | <b>13.2</b> | <b>86.0</b> |
| Secondary health care center             | 100                                | 0.0        | 8.0         | 92.0        |
| Primary health care center               | 100                                | 1.0        | 12.9        | 86.1        |
| Other human health activities            | 100                                | 0.0        | 16.4        | 83.6        |
| <b>Gaza Strip</b>                        | <b>100</b>                         | <b>1.0</b> | <b>13.3</b> | <b>85.7</b> |
| Secondary health care center             | 100                                | 0.0        | 0.0         | 100.0       |
| Primary health care center               | 100                                | 0.0        | 12.4        | 87.6        |
| Other human health activities            | 100                                | 7.2        | 22.6        | 70.2        |

2004

:23

**Table 23: Percent Distribution of Health Care Center in the Palestinian Territory by the Container Volume, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Container volume (m <sup>3</sup> ) |                    |            |             |             |
|--|------------------------------------|--------------------|------------|-------------|-------------|
|  | Total                              | 12<br>More than 12 | 12-7       | 6-4         | 3-1         |
| <b>Palestinian Territory</b>             | <b>100</b>                         | <b>1.5</b>         | <b>4.3</b> | <b>14.1</b> | <b>80.1</b> |
| Secondary health care center             | 100                                | 5.7                | 10.9       | 30.6        | 52.8        |
| Primary health care center               | 100                                | 1.1                | 4.4        | 13.3        | 81.2        |
| Other human health activities            | 100                                | 3.5                | 1.9        | 13.9        | 80.7        |
| <b>West Bank</b>                         | <b>100</b>                         | <b>0.9</b>         | <b>5.6</b> | <b>17.0</b> | <b>76.5</b> |
| Secondary health care center             | 100                                | 6.0                | 11.1       | 34.4        | 48.5        |
| Primary health care center               | 100                                | 0.5                | 5.7        | 16.4        | 77.4        |
| Other human health activities            | 100                                | 2.2                | 2.6        | 15.9        | 79.3        |
| <b>Gaza Strip</b>                        | <b>100</b>                         | <b>3.6</b>         | <b>0.4</b> | <b>4.4</b>  | <b>91.6</b> |
| Secondary health care center             | 100                                | 4.5                | 10.2       | 18.2        | 67.1        |
| Primary health care center               | 100                                | 3.0                | 0.0        | 3.2         | 93.8        |
| Other human health activities            | 100                                | 7.2                | 0.0        | 8.3         | 84.5        |

2004

**Table 24: Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Place, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Waste collection place |                       |                             |                               |
|--|------------------------|-----------------------|-----------------------------|-------------------------------|
|  | Total                  | Outside the<br>center | Inside the<br>center square | Inside the<br>center building |
| <b>Palestinian Territory</b>             | <b>100</b>             | <b>34.7</b>           | <b>12.5</b>                 | <b>52.8</b>                   |
| Secondary health care center             | 100                    | 57.1                  | 29.8                        | 13.1                          |
| Primary health care center               | 100                    | 34.9                  | 11.3                        | 53.8                          |
| Other human health activities            | 100                    | 28.2                  | 16.0                        | 55.8                          |
| <b>West Bank</b>                         | <b>100</b>             | <b>36.8</b>           | <b>14.8</b>                 | <b>48.4</b>                   |
| Secondary health care center             | 100                    | 58.3                  | 25.8                        | 15.9                          |
| Primary health care center               | 100                    | 37.5                  | 13.8                        | 48.7                          |
| Other human health activities            | 100                    | 25.8                  | 19.9                        | 54.3                          |
| <b>Gaza Strip</b>                        | <b>100</b>             | <b>27.6</b>           | <b>4.7</b>                  | <b>67.7</b>                   |
| Secondary health care center             | 100                    | 53.1                  | 42.7                        | 4.2                           |
| Primary health care center               | 100                    | 25.4                  | 2.9                         | 71.7                          |
| Other human health activities            | 100                    | 34.2                  | 6.1                         | 59.7                          |

()

:25

2004

**Table 25: Percent Distribution of Health Care Center in the Palestinian Territory by, Distance between Health Care Center and Waste Collection Place (m), Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | () Distance between health care center and waste collection place(m) |                      |             |                    |
|--|--|----------------------|-------------|--------------------|
|  | Total  | 151<br>More than 151 | 150-51      | 50<br>Less than 50 |
| Palestinian Territory                    | <b>100</b>   | <b>4.9</b>           | <b>11.7</b> | <b>83.4</b>        |
| Secondary health care center             | 100  | 3.5                  | 6.9         | 89.6               |
| Primary health care center               | 100  | 5.2                  | 11.0        | 83.8               |
| Other human health activities            | 100  | 2.8                  | 19.9        | 77.3               |
| <b>West Bank</b>                         | <b>100</b>   | <b>5.8</b>           | <b>11.7</b> | <b>82.5</b>        |
| Secondary health care center             | 100  | 4.5                  | 4.5         | 91.0               |
| Primary health care center               | 100  | 6.1                  | 10.4        | 83.5               |
| Other human health activities            | 100  | 4.3                  | 30.5        | 65.2               |
| <b>Gaza Strip</b>                        | <b>100</b>   | <b>0.7</b>           | <b>11.5</b> | <b>87.8</b>        |
| Secondary health care center             | 100  | 0.0                  | 15.7        | 84.3               |
| Primary health care center               | 100  | 0.9                  | 14.1        | 85.0               |
| Other human health activities            | 100  | 0.0                  | 0.0         | 100.0              |

2004

**Table 26: Percent Distribution of Health Care Center in the Palestinian Territory by the Doer of Transporting Solid Waste, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Doer of Transporting the waste |            |            |                    |                 |                        |
|--|--------------------------------|------------|------------|--------------------|-----------------|------------------------|
|  | Total                          | Others     | UNRWA      | Private contractor | Local Authority | The health care center |
| <b>Palestinian Territory</b>             | <b>100</b>                     | <b>3.6</b> | <b>1.7</b> | <b>0.1</b>         | <b>83.1</b>     | <b>11.5</b>            |
| Secondary health care center             | 100                            | 15.0       | 1.0        | 1.6                | 71.7            | 10.7                   |
| Primary health care center               | 100                            | 3.2        | 1.7        | 0.1                | 83.4            | 11.6                   |
| Other human health activities            | 100                            | 3.1        | 2.0        | 0.0                | 84.2            | 10.7                   |
| <b>West Bank</b>                         | <b>100</b>                     | <b>4.6</b> | <b>0.6</b> | <b>0.2</b>         | <b>82.0</b>     | <b>12.6</b>            |
| Secondary health care center             | 100                            | 18.4       | 1.3        | 2.1                | 66.8            | 11.4                   |
| Primary health care center               | 100                            | 4.1        | 0.6        | 0.2                | 82.4            | 12.7                   |
| Other human health activities            | 100                            | 4.4        | 0.7        | 0.0                | 82.7            | 12.2                   |
| <b>Gaza Strip</b>                        | <b>100</b>                     | <b>0.1</b> | <b>5.2</b> | <b>0.0</b>         | <b>87.0</b>     | <b>7.7</b>             |
| Secondary health care center             | 100                            | 4.2        | 0.0        | 0.0                | 87.5            | 8.3                    |
| Primary health care center               | 100                            | 0.0        | 5.4        | 0.0                | 86.8            | 7.8                    |
| Other human health activities            | 100                            | 0.0        | 5.3        | 0.0                | 87.7            | 7.0                    |

2004

**Table 27: Percent Distribution of Health Care Center in the Palestinian Territory by the Waste Final Disposal Place, Region and Type of the Health Care Center, 2004**

| Region<br>and type of health care center | Waste Final Disposal Place |            |                   |                      |                              |
|--|----------------------------|------------|-------------------|----------------------|------------------------------|
|  | Total                      | Others     | Disposed randomly | Private dumping site | Local authority dumping site |
| <b>Palestinian Territory</b>             | <b>100</b>                 | <b>5.1</b> | <b>0.2</b>        | <b>10.0</b>          | <b>84.7</b>                  |
| Secondary health care center             | 100                        | 13.4       | 0.0               | 13.5                 | 73.1                         |
| Primary health care center               | 100                        | 4.9        | 0.2               | 10.6                 | 84.3                         |
| Other human health activities            | 100                        | 4.7        | 0.0               | 5.5                  | 89.8                         |
| <b>West Bank</b>                         | <b>100</b>                 | <b>6.3</b> | <b>0.3</b>        | <b>10.1</b>          | <b>83.3</b>                  |
| Secondary health care center             | 100                        | 17.6       | 0.0               | 17.7                 | 64.7                         |
| Primary health care center               | 100                        | 6.2        | 0.3               | 10.2                 | 83.3                         |
| Other human health activities            | 100                        | 4.4        | 0.0               | 7.8                  | 87.8                         |
| <b>Gaza Strip</b>                        | <b>100</b>                 | <b>1.1</b> | <b>0.0</b>        | <b>9.6</b>           | <b>89.3</b>                  |
| Secondary health care center             | 100                        | 0.0        | 0.0               | 0.0                  | 100.0                        |
| Primary health care center               | 100                        | 0.4        | 0.0               | 11.7                 | 87.9                         |
| Other human health activities            | 100                        | 5.3        | 0.0               | 0.0                  | 94.7                         |

2004

**Table 28: Percent Distribution of Health Care Center in the Palestinian Territory by the Weekly Periodicity of Final Disposal of Waste, Region and Type of the Health Care Center, 2004**

| Region and type of health care center | Periodicity |                           |                  |             |
|---------------------------------------|-------------|---------------------------|------------------|-------------|
|                                       | Total       | 7<br>More than 7<br>times | 6-4<br>4-6 times |             |
| <b>Palestinian Territory</b>          | <b>100</b>  | <b>12.3</b>               | <b>53.7</b>      | <b>34.0</b> |
| Secondary health care center          | 100         | 41.3                      | 41.7             | 17.0        |
| Primary health care center            | 100         | 11.0                      | 53.5             | 35.5        |
| Other human health activities         | 100         | 13.9                      | 58.2             | 27.9        |
| <b>West Bank</b>                      | <b>100</b>  | <b>14.9</b>               | <b>43.2</b>      | <b>41.9</b> |
| Secondary health care center          | 100         | 41.9                      | 41.0             | 17.1        |
| Primary health care center            | 100         | 13.6                      | 42.7             | 43.7        |
| Other human health activities         | 100         | 17.0                      | 48.1             | 34.9        |
| <b>Gaza Strip</b>                     | <b>100</b>  | <b>3.8</b>                | <b>88.6</b>      | <b>7.6</b>  |
| Secondary health care center          | 100         | 39.5                      | 43.8             | 16.7        |
| Primary health care center            | 100         | 2.0                       | 91.3             | 6.7         |
| Other human health activities         | 100         | 6.2                       | 83.3             | 10.5        |

2004

**Table 29: Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Consumed Water Quantity in the Health Care Center, Region and Type of Health Care Center, 2004**

| Region and type of health care center | Type of effect |                         |                         | Existence of intifada effect |
|---------------------------------------|----------------|-------------------------|-------------------------|------------------------------|
|                                       | Total          | Consumed water decrease | Consumed water increase |                              |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>87.8</b>             | <b>12.2</b>             | <b>26.1</b>                  |
| Secondary health care center          | 100            | 72.5                    | 27.5                    | 32.1                         |
| Primary health care center            | 100            | 88.2                    | 11.8                    | 26.3                         |
| Other human health activities         | 100            | 89.6                    | 10.4                    | 23.1                         |
| <b>West Bank</b>                      | <b>100</b>     | <b>92.0</b>             | <b>8.0</b>              | <b>28.0</b>                  |
| Secondary health care center          | 100            | 68.7                    | 31.3                    | 29.7                         |
| Primary health care center            | 100            | 93.6                    | 6.4                     | 28.9                         |
| Other human health activities         | 100            | 83.7                    | 16.3                    | 20.7                         |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>67.5</b>             | <b>32.5</b>             | <b>19.7</b>                  |
| Secondary health care center          | 100            | 81.6                    | 18.4                    | 39.6                         |
| Primary health care center            | 100            | 55.8                    | 44.2                    | 17.2                         |
| Other human health activities         | 100            | 100.0                   | 0.0                     | 28.9                         |

2004

**Table 30: Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Wastewater Treatment in Health Care Center, Region and Type of Health Care Center, 2004**

| Region and type of health care center | Type of effect |                          |                          |                             | Existence of intifada effect |
|---------------------------------------|----------------|--------------------------|--------------------------|-----------------------------|------------------------------|
|                                       | Total          | Treatment method changed | Treatment process paused | Treated components decrease |                              |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>13.4</b>              | <b>31.6</b>              | <b>55.0</b>                 | <b>1.8</b>                   |
| Secondary health care center          | 100            | 34.2                     | 15.2                     | 50.6                        | 6.5                          |
| Primary health care center            | 100            | 10.9                     | 33.5                     | 55.6                        | 1.9                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |
| <b>West Bank</b>                      | <b>100</b>     | <b>12.5</b>              | <b>34.9</b>              | <b>52.6</b>                 | <b>2.1</b>                   |
| Secondary health care center          | 100            | 23.1                     | 23.1                     | 53.8                        | 5.6                          |
| Primary health care center            | 100            | 11.6                     | 35.9                     | 52.5                        | 2.3                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>22.2</b>              | <b>0.0</b>               | <b>77.8</b>                 | <b>0.8</b>                   |
| Secondary health care center          | 100            | 55.6                     | 0.0                      | 44.4                        | 9.4                          |
| Primary health care center            | 100            | 0.0                      | 0.0                      | 100.0                       | 0.6                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |

2004

**Table 31: Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Separation in Health Care Center, Region and Type of Health Care Center, 2004**

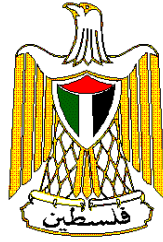
| Region and type of health care center | Type of effect |                           |                               | Existence of intifada effect |
|---------------------------------------|----------------|---------------------------|-------------------------------|------------------------------|
|                                       | Total          | Separation process paused | Separated components decrease |                              |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>32.7</b>               | <b>67.3</b>                   | <b>3.1</b>                   |
| Secondary health care center          | 100            | 22.9                      | 77.1                          | 8.7                          |
| Primary health care center            | 100            | 32.9                      | 67.1                          | 3.3                          |
| Other human health activities         | 100            | 100.0                     | 0.0                           | 0.2                          |
| <b>West Bank</b>                      | <b>100</b>     | <b>34.4</b>               | <b>65.6</b>                   | <b>3.7</b>                   |
| Secondary health care center          | 100            | 26.7                      | 73.3                          | 9.7                          |
| Primary health care center            | 100            | 35.1                      | 64.9                          | 4.0                          |
| Other human health activities         | 100            | -                         | -                             | 0.0                          |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>12.9</b>               | <b>87.1</b>                   | <b>1.0</b>                   |
| Secondary health care center          | 100            | 0.0                       | 100.0                         | 5.2                          |
| Primary health care center            | 100            | 0.0                       | 100.0                         | 0.9                          |
| Other human health activities         | 100            | 100.0                     | 0.0                           | 0.9                          |

2004

**Table 32: Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Treatment in Health Care Center, Region and Type of Health Care Center, 2004**

| Region and type of health care center | Type of effect |                          |                          |                             | Existence of intifada effect |
|---------------------------------------|----------------|--------------------------|--------------------------|-----------------------------|------------------------------|
|                                       | Total          | Treatment method changed | Treatment process paused | Treated components decrease |                              |
| <b>Palestinian Territory</b>          | <b>100</b>     | <b>19.8</b>              | <b>38.1</b>              | <b>42.1</b>                 | <b>2.0</b>                   |
| Secondary health care center          | 100            | 34.2                     | 30.4                     | 35.4                        | 6.5                          |
| Primary health care center            | 100            | 18.2                     | 38.9                     | 42.9                        | 2.1                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |
| <b>West Bank</b>                      | <b>100</b>     | <b>17.3</b>              | <b>38.6</b>              | <b>44.1</b>                 | <b>2.3</b>                   |
| Secondary health care center          | 100            | 18.8                     | 37.4                     | 43.8                        | 6.9                          |
| Primary health care center            | 100            | 17.1                     | 38.7                     | 44.2                        | 2.4                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |
| <b>Gaza Strip</b>                     | <b>100</b>     | <b>41.8</b>              | <b>33.3</b>              | <b>24.9</b>                 | <b>0.9</b>                   |
| Secondary health care center          | 100            | 100.0                    | 0.0                      | 0.0                         | 5.2                          |
| Primary health care center            | 100            | 28.7                     | 40.7                     | 30.6                        | 0.9                          |
| Other human health activities         | 100            | -                        | -                        | -                           | 0.0                          |





# **Palestinian Central Bureau of Statistics**

## **Environmental Survey for Health Care Centers, 2004 Main Findings**

**December, 2004**

“ Cover Price US \$ 3”

PAGE NUMBERS OF ENGLISH TEXT ARE PRINTED IN SQUARE BRACKETS.  
TABLES ARE PRINTED IN THE ARABIC ORDER (FROM RIGHT TO LEFT).

© December, 2004  
**All Rights Reserved**

**Suggested Citation:**

**Palestinian Central Bureau of Statistics, 2004.** *Environmental Survey for Health Care Centers, 2004: Main Findings.* Ramallah - Palestine.

All correspondence should be directed to:  
Dissemination and Documentation Department/ Division of user services  
**Palestinian Central Bureau of Statistics**  
**P.O.Box 1647, Ramallah, Palestine.**

Tel: (972/970) 2 2406340  
E-mail: [diwan@pcbs.gov.ps](mailto:diwan@pcbs.gov.ps)

Fax: (972/970) 2 2406343  
Web-site: <http://www.pcbs.gov.ps>

## **Acknowledgment**

**The Palestinian Central Bureau of Statistics (PCBS) expresses its gratitude to the Ministry of Health and to All non-Governmental Organizations working in the Health Care Sector and all Private Health Care Sector for their cooperation.**

**Financial support for the Environmental Survey for Health Care Centers at the PCBS is being provided by the Palestinian National Authority (PNA) and the Core Funding Group (CFG) represented by The Representative Office of Norway to the PNA; The Representative Office of the Netherlands to PNA; Swiss Agency for Development and Cooperation (SDC); UK Department for International Development (DFID); The European Commission (EC); and The World Bank (WB).**

**On this occasion, the PCBS extends special thanks to the Core Funding Group (CFG) for this support.**



## **Preface**

As the attention towards environment and the risk of environmental pollution increase, environment statistics become one of the basic fields in the official statistics. The Health Care waste statistics is an important subject in the environment statistics due to its negative effects on the health and the environment if not disposed properly. Many decisions depend on such statistics, especially in Palestinian Territory where statistics about it is not available.

The Palestinian Central Bureau of Statistics (PCBS) seeks to provide such data through its program for environment statistics that aims at building and updating a comprehensive and accurate statistical database on all environmental subjects. This program aims to provide statistical data as a tool for monitoring and management of the environmental status in the Palestinian Territory.

This report is one of a series of reports that are being published by the PCBS on the Palestinian environment. The report presents the most important Health Care waste statistics for the private sector indicators as collected from different sources.

This report concentrates on the variables of water consumption, Health Care waste collection, separation and disposal, and wastewater disposal in the Governmental and non-Governmental Health Care Centers.

PCBS hopes that the findings of this report will be a reference for planners and decision-makers towards improving the environmental status in the Palestinian Territory.

**December, 2004**

**Hasan Abu-Libdeh, Ph.D.  
President**



## Table of Contents

| <b>Subject</b>   | <b>Page</b> |
|--|-------------|
| List of Tables   |             |
| List of Figures  |             |
| Executive Summary  |             |
| Chapter One: <b>Introduction</b>                           | <b>[17]</b> |
| 1.1 Objectives of the Report                               | [17]        |
| 1.2 Report Structure                                       | [17]        |
| Chapter Two: <b>Definitions and Explanations</b>           | <b>[19]</b> |
| Chapter Three: <b>Main Findings</b>                        | <b>[23]</b> |
| 3.1 Water  | [23]        |
| 3.2 Wastewater   | [23]        |
| 3.3 Health Care Solid Waste                                | [24]        |
| 3.4 Problems Faced Health Care Centers During the Intifada | [26]        |
| Chapter Four: <b>Methodology</b>                           | <b>[27]</b> |
| 4.1 The Survey Questionnaire                               | [27]        |
| 4.2 Sampling and Sampling Frame                            | [27]        |
| 4.3 Field Work   | [28]        |
| 4.4 Data Processing  | [28]        |
| Chapter Five: <b>Data Quality</b>                          | <b>[29]</b> |
| 5.1 Statistical Errors                                     | [29]        |
| 5.2 Non-Statistical Errors                                 | [29]        |
| <b>References</b>  | <b>[31]</b> |
| <b>Tables</b>  | <b>37</b>   |





## List of Tables

| <b>Table</b>     |  | <b>Page</b> |
|------------------|--|-------------|
| <b>Table 1:</b>  | Main Selected Indicators about the Activity of the Health care center in the Palestinian Territory from Environmental Sides for the Years 2003 and 2004                            | <b>39</b>   |
| <b>Table 2:</b>  | Estimated Monthly Quantity of Water Consumed in the Palestinian Territory from Health Care Center by Type of Health Care Center and Region, 2004                                   | <b>40</b>   |
| <b>Table 3:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Means of Obtaining Water, Region and Type of Health Care Center, 2004                                   | <b>40</b>   |
| <b>Table 4:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Wastewater Disposal Method, Region and Type of Health Care Center, 2004                                 | <b>41</b>   |
| <b>Table 5:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Wastewater Treatment, Method of Treatment, Region and Type of Health Care Center, 2004     | <b>41</b>   |
| <b>Table 6:</b>  | Estimated Monthly Quantity of Solid Waste Produced from Health Care Center in the Palestinian Territory by Type of Health Care Center and Region, 2004                             | <b>42</b>   |
| <b>Table 7:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Separation and type of Separation, Region and Type of Health Care Center, 2004 | <b>42</b>   |
| <b>Table 8:</b>  | Percentage of Health Care Center in the Palestinian Territory by Type of Separated Waste, Region and Type of Health Care Center, 2004  | <b>43</b>   |
| <b>Table 9:</b>  | Estimated Monthly Quantity of Separated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004                                | <b>44</b>   |
| <b>Table 10:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where General Waste Put in, Region and Type of Health Care Center, 2004                       | <b>44</b>   |
| <b>Table 11:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Infectious Waste Put in, Region and Type of Health Care Center, 2004                    | <b>45</b>   |
| <b>Table 12:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Sharp Waste Put in, Region and Type of Health Care Center, 2004                         | <b>45</b>   |
| <b>Table 13:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Non Separated Solid Waste Put in, Region, and Type of Health Care Center, 2004          | <b>46</b>   |

| <b>Table</b>  | <b>Page</b> |
|---|-------------|
| <b>Table 14:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of General waste, Infectious waste and Sharp waste, Region and Type of Health Care Center, 2004     | <b>47</b>   |
| <b>Table 15:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of Non Separated Waste, Region and Type of Health Care Center, 2004                                 | <b>48</b>   |
| <b>Table 16:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of General waste, Infectious waste and Sharp waste Collection, Region and Type of Health Care Center, 2004 | <b>49</b>   |
| <b>Table 17:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of Non-Separated Solid Waste Collection, Region and Type of Health Care Center, 2004                       | <b>50</b>   |
| <b>Table 18:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Waste Treatment, Type of Treatment, Region and Type of Health Care Center, 2004                                  | <b>51</b>   |
| <b>Table 19:</b> Estimated Monthly Quantity of Treated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004  | <b>52</b>   |
| <b>Table 20:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Treatment, Doer of Treatment, Region and Type of Health Care Center, 2004                            | <b>52</b>   |
| <b>Table 21:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Mean inside the Health Care Center, Region and Type of Health Care Center, 2004                    | <b>53</b>   |
| <b>Table 22:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Material Construction, Region and Type of Health Care Center, 2004  | <b>54</b>   |
| <b>Table 23:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Volume, Region and Type of Health Care Center, 2004   | <b>54</b>   |
| <b>Table 24:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Place, Region and Type of Health Care Center, 2004   | <b>55</b>   |
| <b>Table 25:</b> Percent Distribution of Health Care Center in the Palestinian Territory by, Distance Between Health Care Center and Waste Collection Place (m), Region and Type of Health Care Center, 2004              | <b>55</b>   |
| <b>Table 26:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Doer of Transporting Solid Waste, Region and Type of Health Care Center, 2004   | <b>56</b>   |

| <b>Table</b>   | <b>Page</b> |
|--|-------------|
| <b>Table 27:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Waste Final Disposal Place, Region and Type of Health Care Center, 2004  | <b>56</b>   |
| <b>Table 28:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Weekly Periodicity of Final Disposal of Waste, Region and Type of Health Care Center, 2004                           | <b>57</b>   |
| <b>Table 29:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Consumed Water Quantity in the Health Care Center, Region and Type of Health Care Center, 2004 | <b>57</b>   |
| <b>Table 30:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Wastewater Treatment in Health Care Center, Region and Type of Health Care Center, 2004        | <b>58</b>   |
| <b>Table 31:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Separation in Health Care Center, Region and Type of Health Care Center, 2004      | <b>58</b>   |
| <b>Table 32:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Treatment in Health Care Center, Region and Type of Health Care Center, 2004       | <b>59</b>   |



## List of Figures

| <b>Figure</b>    |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Figure 1:</b> | Estimated Monthly Quantity of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004                     | [23]        |
| <b>Figure 2:</b> | Percent Distribution of Health Care Center by the Method of Wastewater Disposal and Type of Center, 2004                            | [24]        |
| <b>Figure 3:</b> | Estimated Monthly Quantity of Health Care Waste Produced from Health Care Center by Type of Center, 2004                            | [24]        |
| <b>Figure 4:</b> | Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004   | [25]        |
| <b>Figure 5:</b> | Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004 | [26]        |
| <b>Figure 6:</b> | Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004             | [26]        |



## **Executive Summary**

The estimated monthly quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in health care centers in Gaza Strip.

The result show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

The result show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and the percentage of the secondary health care centers that do not treat wastewater is 93.2%.

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 381 tons and 5.8 thousands cubic meter including 275 tons and 1.9 thousands cubic meter in the West Bank and 106 tons and 3.9 thousands cubic meter in Gaza Strip. 49.0% of the health care centers in the Palestinian Territory perform separation of health care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components.

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al–Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

## Chapter One

### **Introduction**

Environmental statistics in the health care centers is very interested and this statistics is an important instrument to make decisions, planning, and draw the outlines for environment. And relating to infrequency of data about this subject in the Palestinian Territory, the Palestinian Central Bureau of Statistics (PCBS) building up and develop a database about environmental in the health care centers.

The sources of the data in this report are Health Care Environment Survey 2004 (for the data about governmental and non-governmental organizations sectors), and Economical Environmental Survey 2004 (for the data about private sector).

#### **1.1 Objectives of the Report**

The main objective of this report is to make overview about the main indicators of environment in the health care centers in three sectors (governmental, non-governmental organizations and private sector), which including:

- Water consume.
- management of wastewater.
- management of health Care waste.
- Problems faced Health care centers During Intifada.

#### **1.2 Report Structure**

This report consists of five chapters: the first chapter presents introduction, the report objectives and the report structure, the second chapter describes the definitions and explanations, the third chapter briefly describes the main findings, while the fourth chapter presents the methodology used in the survey, consisting the questionnaire design, sampling design, fieldwork operations and data processing, the last chapter includes an assessment of data quality and technical notes





## Chapter Two

### Concepts and Definitions

|   |  |
|---|--|
| <b>Biological Treatment:</b>                        | Wastewater treatment employing aerobic and anaerobic microorganisms that results in decanted effluents and Separate sludge Containing microbial mass together with pollutants. Biological treatment processes are also used in combination or in conjunction with mechanical and advanced unit operations. |
| <b>Cesspit:</b>                                     | A well or a pit in which night soil and other refuse is stored, constructed with either tight or porous walls.   |
| <b>Chemical Disinfection:</b>                       | Chemicals used for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Chemical Treatment:</b>                          | Treatment methods that are used to effect the complete breakdown of hazardous Waste in to non-toxic gases or, more frequently, to modify the chemical properties of the Waste, for example, through reduction of water solubility or neutralization of acidity or alkalinity.                              |
| <b>Chemical Waste:</b>                              | May be hazardous – toxic, corrosive, flammable, reactive or genotoxic (capable of altering genetic material), or non-hazardous.  |
| <b>Clinical Waste (Health Care Waste):</b>          | Any waste coming out of health Care provided in hospitals or other health care centers. However the definition does not include health Care waste resulting from health care at home.  |
| <b>Disinfection:</b>                                | Effective killing by chemical and physical processes of all organisms capable of causing infectious diseases.  |
| <b>Dumping Site:</b>                                | Site used to dispose of solid wastes without environmental control.  |
| <b>General waste:</b>                               | All non hazardous waste, similar in nature to domestic waste   |
| <b>Hospital waste:</b>                              | Waste coming out of hospitals. Such waste is around 85 % non-hazardous, around 10 % are infectious, around 5% non-infectious but hazardous.  |
| <b>Incineration (Dry Thermal Disinfection):</b>     | Controlled burning of solid, liquid or gaseous waste materials at high temperatures.   |
| <b>Infectious Waste:</b>                            | All kinds of waste, which may transmit viral, bacterial or parasitic diseases to human beings. It includes infectious animal waste from laboratories, slaughter- houses, veterinary practices and so on.   |
| <b>Irradiation:</b>                                 | Use of radiation (X rays, or gamma rays) for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Mechanical Treatment (of Health Care waste):</b> | Crush, break, cut or otherwise damage of sharps prior to treatment.  |

|  |  |
|--|--|
| <b>Mechanical Treatment (of Wastewater):</b> | Wastewater treatment of physical and mechanical nature that results in decanted effluents and Separate Sludge. Mechanical treatment processes are also used in combination with biological and advanced unit operations. Mechanical treatment includes Processes such as sedimentation and flotation.                        |
| <b>Open burning:</b>                         | Out door burning of wastes such as lumber, scrapped cars, textiles, sawdust and so forth.  |
| <b>Pharmaceutical Waste:</b>                 | This includes pharmaceutical products, drugs and chemicals, which have been returned from wards, have been spilled or soiled, are out of date or contaminated, or are to be discarded for any reason.  |
| <b>Primary Health Care Center:</b>           | Health center offers preventive care (diagnostic and curative) before illness case is complicated.   |
| <b>Radioactive Waste:</b>                    | Material that contains or is contaminated with radionuclides at concentrations greater than those established as “exempt” by the competent authorities. To avoid persistent harmful effects, long-term storage is necessary, for which purpose so-called “isotope cemeteries” and abandoned quarries are used.               |
| <b>Secondary Health Care Center:</b>         | Health center offers curative and nursing health care for illness case exceeding Primary Health Care.  |
| <b>Separation (Segregation):</b>             | The system separation of solid waste into designated categories  |
| <b>Sewage Network:</b>                       | System of collectors, pipelines, conduits and pumps to evacuate wastewater (rainwater, domestic and other wastewater) from any of the location paces generation either to municipal sewage treatment plant or to a location place where wastewater is discharged.  |
| <b>Sharps:</b>                               | Any item that could cause a cut or puncture (especially needles and blades).   |
| <b>Solid Waste Disposal:</b>                 | Ultimate deposition or placement of refuse that is not salvaged or recycled.   |
| <b>Solid Waste:</b>                          | Useless and sometimes hazardous material with low liquid content, solid wastes include municipal garbage, industrial and commercial waste, sewage sludge, wastes resulting from agricultural and animal husbandry operations and other connected activities, demolition wastes and mining residues                           |
| <b>Storage (of the Health Care Waste):</b>   | The containment of health care waste in manner that dose not constitute disposal of the health care waste.   |
| <b>Transport of the Health Care Waste:</b>   | The movement of the health care waste from the point of generation to any intermediate point and finally to the point of treatment or disposal. Transport does not include the movement of health care waste from a health facility or agency to another health facility or agency for the purposes of testing and research. |

**Treatment of the Health Care Waste:** Processes that modify the waste in some way before it is taken to its final resting place.

**Waste Collection:** Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or governmental and non-governmental corporations, specialized enterprises or general government. Collection of municipal waste may be selective, that's to say carried out for a specific type of product, or undifferentiated, in other words, covering all kinds of waste at the same time.

**Wastewater Treatment:** Process to render wastewater fit to meet environmental standards or other quality norms. Three broad types of treatment may be distinguished: mechanical, biological, and advanced.

**Wastewater:** Used water, typically discharged into the sewage system. It contains matter and bacteria in solution or suspension.

**Wet Thermal Disinfections:** Autoclaving at 160 Co under high pressure to effective killing of all organisms capable of causing infectious diseases.

**Symbols Used in Tables:**

(-) Not available

(0) less than half of the unit



## Main Findings

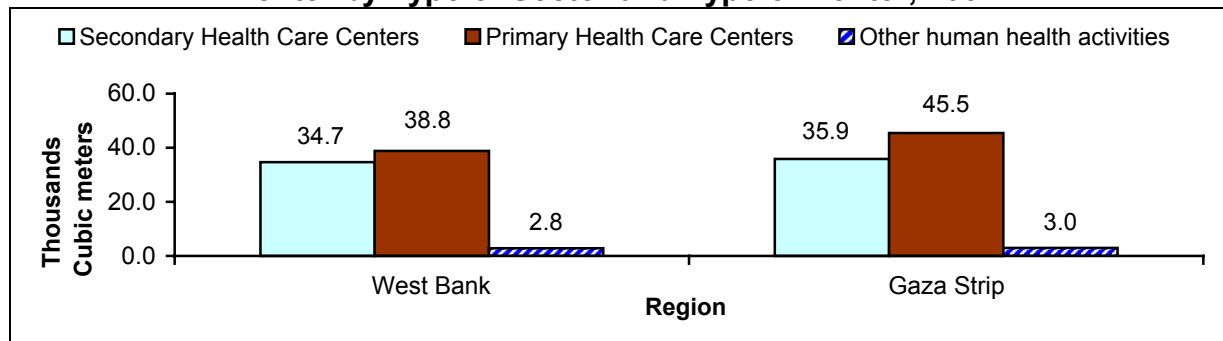
This section presents the main findings of the Care Environment Survey 2004 and data for private health care sector which come from Economical Environmental Survey 2004. Statistical results are classified according to the main components of environmental elements in the governmental and non-governmental health care centers, including water, health care waste, and wastewater.

### 3.1 Water:

#### Consumption:

The estimated quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in Gaza Strip.

**Figure 1: Estimated Monthly Quantities of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004**



#### Sources of Water Supply:

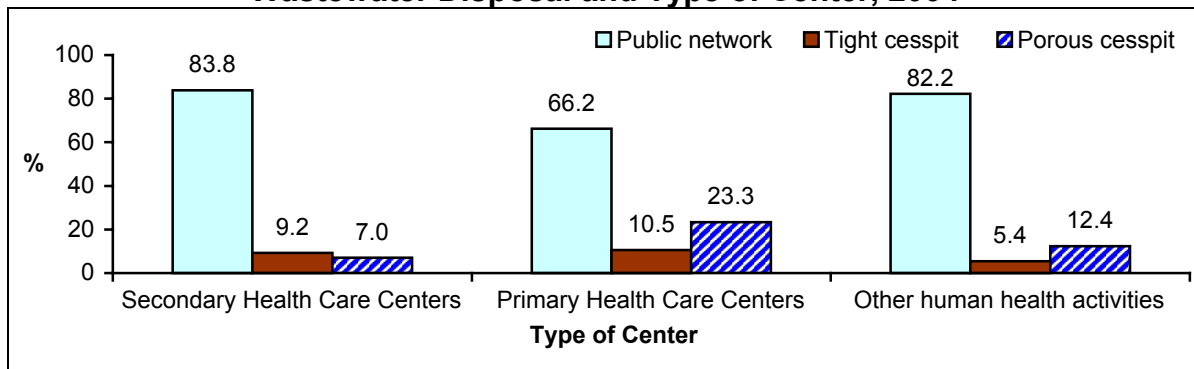
The results show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

### 3.2 Wastewater:

#### Disposal Methods:

The results show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and 9.9% of the health care centers use tight cesspit. Also 21.4% of the health care centers use porous cesspit.

**Figure 2: Percent Distribution of Health Care Centers by the Method of Wastewater Disposal and Type of Center, 2004**



**Treatment of Wastewater:**

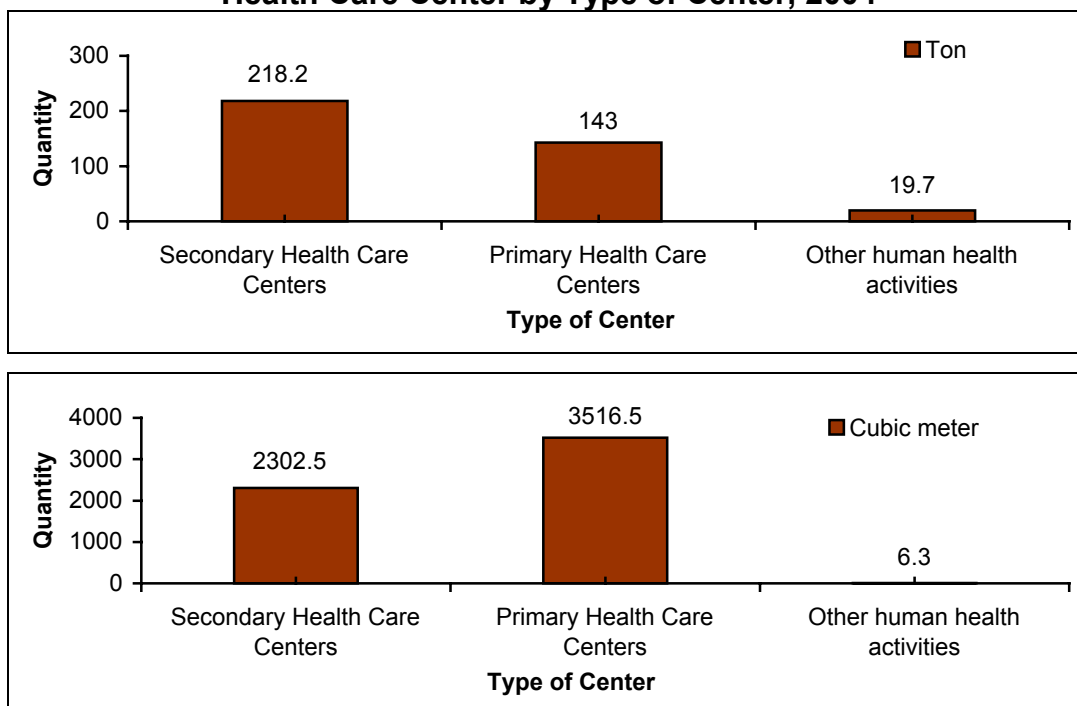
The percentage of the secondary health care centers that do not treat wastewater is 93.2%, 99.3% of primary the health care centers and 99.2% of other human health activities. The main treatment methods used are the mechanical, the chemical treatments and biological treatment.

**3.3 Health Care Solid Waste:**

**Quantity:**

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 380.9 tons and 5.8 thousands cubic meter including 274.8 tons and 1.9 thousands cubic meter in the West Bank and 106.1 tons and 3.9 thousands cubic meter in Gaza Strip. While the total estimated quantities produced by the secondary health care centers in the Palestinian Territory were about 218.2 tons and 2.3 thousands cubic meter.

**Figure 3: Estimated Monthly\* Quantities of Health Care Waste Produced from Health Care Center by Type of Center, 2004**



\* The quantities estimated by using two units, cubic meter and ton

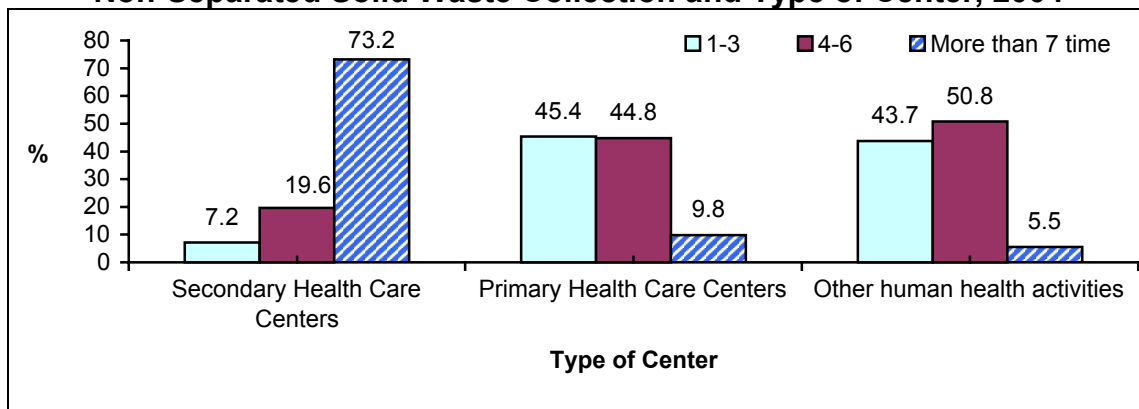
### Separation:

49.0% of the health care centers in the Palestinian Territory perform separation of health Care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components. However, the percentage of the health care centers that perform separation is 58.4% separate General waste, whereas 55.4% of the health care centers separate Infectious waste. The quantities of separated waste in the health care centers were estimated at 145.2 tons and 83.3 cubic meter.

In the Centers that perform waste separation and package the separated waste, the packaging depends on the type of the separated waste. Nylon bags are used for packaging the General waste in 54.7% of the health care centers in the Palestinian Territory, while Plastic boxes are used for packaging the Infectious waste in 37.3% of the health care centers. 76.5% of the health care centers used nylon bags to packaging the non-separated waste.

The periodicity of collecting health care waste is from 4 to 6 times per week in 59.0% of the health care centers. The non-separated waste in the health care centers was collected from 4 to 6 times per week in 44.9% of the health care centers.

**Figure 4: Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004**



### Transportation:

The transportation in the health care centers in the Palestinian Territory that perform separation of General waste is done manually in 96.7% of the health care centers, and 1.9% of the health care centers use special carriages, in otherwise is done manually for Infectious waste in 97.0%, and 1.1% of the health care centers use special carriages. While in the Centers that do not perform separation of waste, the waste was transported manually in 96.3% of the health care centers and using special carriages in 2.2% of the health care centers.

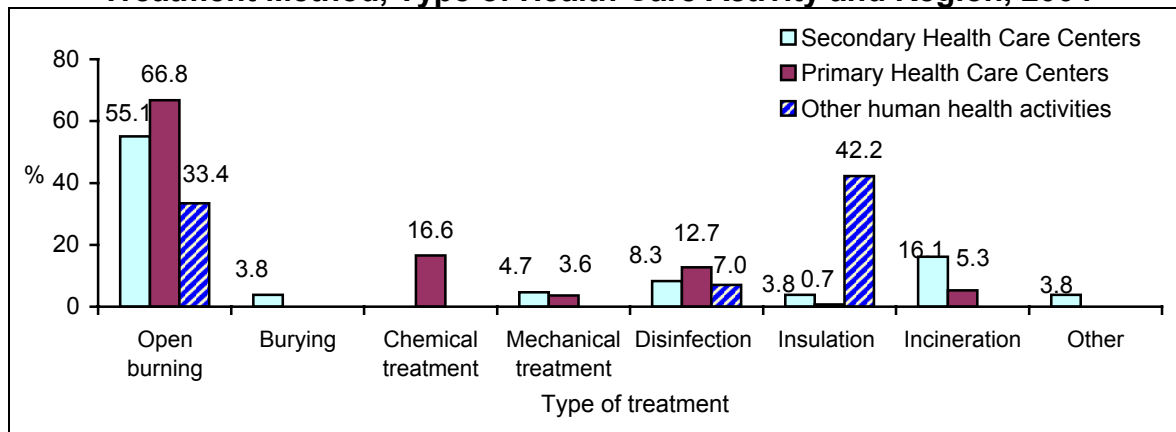
### Treatment:

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health Care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The most important treatment method is the open burning in 64.2% of the health care centers, and 14.7% of them use chemical treatment, and 8.3% used disinfection. The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.



**Figure 5: Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004**



**Disposal:**

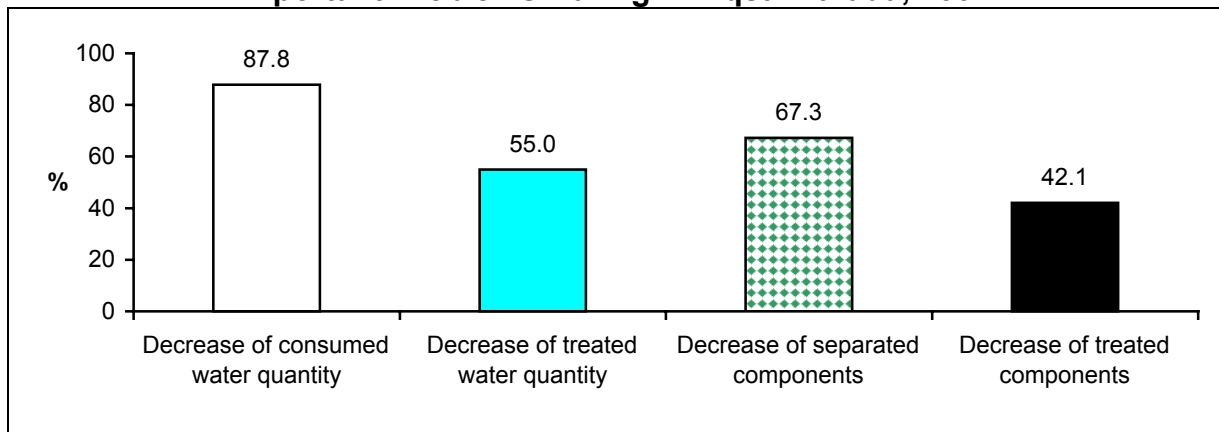
In this stage, the waste is compiled in a place then transferred to a place of final disposal. 61.7% of the health care centers compile waste in a local authority open container, 9.7% of the health care centers in containers local authority closed container, and 5.6% of the health care centers in health care center open container, while 3.9% of the health care centers in health care center closed container and 19.1% of the health care center don't use a container, and 86.0% of used containers made from metal.

The local authority transfers the waste to a place of final disposal in 83.1% of the health care centers. The place of final disposal was a dumping site owned by the local authority for 84.7% of the health care centers in the Palestinian Territory. The periodicity of waste final disposal was 4 to 6 times per week for 53.7% of the health care centers.

**3.4 Problems faced Health care centers During Intifada:**

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

**Figure 6: Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004**



## Chapter Four

### Methodology

#### 4.1 The Survey Questionnaire:

The environmental questionnaire was designed in accordance with the similar country experiments and according to international standards and recommendations for the most important indicators, taking into account the special situation of Palestinian Territory.

#### Test the Questionnaire:

To test the questionnaire we take the results of the last surveys that implemented by the PCBS in 2000, 2001 as a pretest; consequently some modifications were made on the questionnaire and on the instructions.

#### 4.2 Sampling and Sampling Frame:

##### Target Population:

The target population of this survey is all health care centers in the Palestinian Territory, and they divide to:

1. Governmental health care centers (Ministry of Health, Health Care Military Service, Lijan Azakah).
2. Non-governmental health care centers (Health Union Committees, Union of Palestine Health Care Relief Committees, Refits Friends Benevolent Society, UNRWA, Red Crescent Society, and Red Cross) in the Palestinian Territory.
3. Private health care sector.

##### Sampling Frame:

The sampling frame was based on by type of health care centers:

1. **Private Health Care Sector:** The general frame for the establishments which finding of the 1997 Center Census conducted by PCBS, which was updated annually by the updating frame survey 2002.
2. **Governmental and Non-governmental Health care centers:** The frame of the all centers which work in sector of health care which owned by Governmental and Non-governmental health care centers updated annually by thru the administration records in the PCBS.

##### Sample size:

This section is only for the privet sector data, which implemented by using a sample, and the sample size was 285 privet health care center in the Palestinian Territory. It was distributed according to the economic activities into 44 centers of hospital activities, 165 centers of medical and dental practice activities, 76 centers of other human health activities.

##### Sample Design:

The sample of Economical Environmental Survey 2004 is a single-stage stratified cluster random sample.

### **4.3 Field Work:**

The Field Work is the real work to get the demanded data from the primary source, and guarantee a good orthopedist for this stage is the main affair which works on in this stage.

The data in this report come from two sources and each one have a method to collect data about the health care centers.

The data which come from Health Care Environment Survey 2004 collecting by the administrative record team, where they apportion the questionnaires to the respondents to filed by them himself.

And about the data which come from Economical Environmental Survey 2004 collecting by field workers, and this type of collection method must be pass on tow stage:

1. Training Fieldworkers on the main skills before the start of data collection.
2. Distribution the team of Fieldworkers to groups.

### **4.4 Data Processing:**

The data processing stage consisted of the following operations:

#### **Editing before data entry:**

All questionnaires were edited again in the office using the same instructions adopted for editing in the fields.

#### **Data entry:**

In this stage data were entered into the computer, using Microsoft Access. The data entry program was prepared to satisfy a number of requirements such as:

- Duplication of the questionnaire on the computer screen.
- Logical and consistency check of data entered.
- Possibility for internal editing of questions answers.
- Maintaining a minimum of digital data entry and fieldwork errors.
- User-Friendly handling.
- Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SAS and SPSS.

## Chapter Five

### Data Quality

Two types of errors affect the quality of survey data; statistical and non-statistical errors.

#### 5.1 Statistical Errors

This type of errors could be determined easily, and it is result from sampling errors, and this type of errors concern the data of private health care centers. And to reduce this errors the data mast pass tow stage:

#### Estimations Procedure

It is necessary, when calculating the estimations of the survey indicators, to calculate the weights of the establishments. The weight of an establishment is the mathematical inverse of choosing it.

#### Calculation of Variances

Variance is change from a variable to another, it depends on:

1. The sample size
2. The actual variance for all the population units
3. the sample design

The variance for a number of variables was calculated using CENVAR

#### 5.2 Non-Statistical Errors

This type of errors result from non-sampling errors, and could not be determined easily due to the diversity of sources (e.g. the interviewers, respondent, editor, data entry operator... etc).

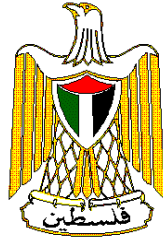
However, several measures were adopted to minimize the effects of these errors. The interviewers, editors and coders had undergone intensive training and were provided with fieldwork manuals to consult when facing any problem.

The data entry program was designed in a way that allows error detection and correction. This applies particularly to logical errors that might not be discovered before data entry operations. A consistency check was also performed to assure accuracy after data entry.



## References

1. Palestinian Central Bureau of Statistics, 1996. *Stander industrial Classification of all Economic Activities for West Bank and Gaza Strip (PISIC)*. Ramallah- Palestine.
2. Palestinian Central Bureau of Statistics, 2000. *Medical Environmental Survey 2000, Main Finding*. Ramallah- Palestine.
3. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers in Private Sector 2001, Main Finding*. Ramallah- Palestine.
4. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers 2001, Main Finding*. Ramallah- Palestine.
5. Palestinian Central Bureau of Statistics, 2003. *Environmental Survey for Health Care Centers 2003, Main Finding*. Ramallah- Palestine.
6. Palestinian Central Bureau of Statistics, 2003. *Environmental Economic Survey-2003: Main Findings*: Ramallah- Palestine.
7. Palestinian Central Bureau of Statistics, 2004. *Environmental Economic Survey-2004: Main Findings*: Ramallah- Palestine.
8. World Health Organization, 1994. *Managing Health Care Waste in Developing Countries*, Geneva - Switzerland.
9. World Health Organization, 1999. *Safe management of waste form health-care activities*, Dr Adrian Coad.
10. United Nations, 1997. *Glossary of Environment Statistics. Series F, NO.67*. New York- USA.



# **Palestinian Central Bureau of Statistics**

## **Environmental Survey for Health Care Centers, 2004 Main Findings**

**December, 2004**

“ Cover Price US \$ 3”

PAGE NUMBERS OF ENGLISH TEXT ARE PRINTED IN SQUARE BRACKETS.  
TABLES ARE PRINTED IN THE ARABIC ORDER (FROM RIGHT TO LEFT).

© December, 2004  
**All Rights Reserved**

**Suggested Citation:**

**Palestinian Central Bureau of Statistics, 2004.** *Environmental Survey for Health Care Centers, 2004: Main Findings.* Ramallah - Palestine.

All correspondence should be directed to:  
Dissemination and Documentation Department/ Division of user services  
**Palestinian Central Bureau of Statistics**  
**P.O.Box 1647, Ramallah, Palestine.**

Tel: (972/970) 2 2406340  
E-mail: [diwan@pcbs.gov.ps](mailto:diwan@pcbs.gov.ps)

Fax: (972/970) 2 2406343  
Web-site: <http://www.pcbs.gov.ps>



## **Acknowledgment**

**The Palestinian Central Bureau of Statistics (PCBS) expresses its gratitude to the Ministry of Health and to All non-Governmental Organizations working in the Health Care Sector and all Private Health Care Sector for their cooperation.**

**Financial support for the Environmental Survey for Health Care Centers at the PCBS is being provided by the Palestinian National Authority (PNA) and the Core Funding Group (CFG) represented by The Representative Office of Norway to the PNA; The Representative Office of the Netherlands to PNA; Swiss Agency for Development and Cooperation (SDC); UK Department for International Development (DFID); The European Commission (EC); and The World Bank (WB).**

**On this occasion, the PCBS extends special thanks to the Core Funding Group (CFG) for this support.**



## **Preface**

As the attention towards environment and the risk of environmental pollution increase, environment statistics become one of the basic fields in the official statistics. The Health Care waste statistics is an important subject in the environment statistics due to its negative effects on the health and the environment if not disposed properly. Many decisions depend on such statistics, especially in Palestinian Territory where statistics about it is not available.

The Palestinian Central Bureau of Statistics (PCBS) seeks to provide such data through its program for environment statistics that aims at building and updating a comprehensive and accurate statistical database on all environmental subjects. This program aims to provide statistical data as a tool for monitoring and management of the environmental status in the Palestinian Territory.

This report is one of a series of reports that are being published by the PCBS on the Palestinian environment. The report presents the most important Health Care waste statistics for the private sector indicators as collected from different sources.

This report concentrates on the variables of water consumption, Health Care waste collection, separation and disposal, and wastewater disposal in the Governmental and non-Governmental Health Care Centers.

PCBS hopes that the findings of this report will be a reference for planners and decision-makers towards improving the environmental status in the Palestinian Territory.

**December, 2004**

**Hasan Abu-Libdeh, Ph.D.  
President**



## Table of Contents

| <b>Subject</b>   | <b>Page</b> |
|--|-------------|
| List of Tables   |             |
| List of Figures  |             |
| Executive Summary  |             |
| Chapter One: <b>Introduction</b>                           | <b>[17]</b> |
| 1.1 Objectives of the Report                               | [17]        |
| 1.2 Report Structure                                       | [17]        |
| Chapter Two: <b>Definitions and Explanations</b>           | <b>[19]</b> |
| Chapter Three: <b>Main Findings</b>                        | <b>[23]</b> |
| 3.1 Water  | [23]        |
| 3.2 Wastewater   | [23]        |
| 3.3 Health Care Solid Waste                                | [24]        |
| 3.4 Problems Faced Health Care Centers During the Intifada | [26]        |
| Chapter Four: <b>Methodology</b>                           | <b>[27]</b> |
| 4.1 The Survey Questionnaire                               | [27]        |
| 4.2 Sampling and Sampling Frame                            | [27]        |
| 4.3 Field Work   | [28]        |
| 4.4 Data Processing  | [28]        |
| Chapter Five: <b>Data Quality</b>                          | <b>[29]</b> |
| 5.1 Statistical Errors                                     | [29]        |
| 5.2 Non-Statistical Errors                                 | [29]        |
| <b>References</b>  | <b>[31]</b> |
| <b>Tables</b>  | <b>37</b>   |



## List of Tables

| <b>Table</b>     |  | <b>Page</b> |
|------------------|--|-------------|
| <b>Table 1:</b>  | Main Selected Indicators about the Activity of the Health care center in the Palestinian Territory from Environmental Sides for the Years 2003 and 2004                            | <b>39</b>   |
| <b>Table 2:</b>  | Estimated Monthly Quantity of Water Consumed in the Palestinian Territory from Health Care Center by Type of Health Care Center and Region, 2004                                   | <b>40</b>   |
| <b>Table 3:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Means of Obtaining Water, Region and Type of Health Care Center, 2004                                   | <b>40</b>   |
| <b>Table 4:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Wastewater Disposal Method, Region and Type of Health Care Center, 2004                                 | <b>41</b>   |
| <b>Table 5:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Wastewater Treatment, Method of Treatment, Region and Type of Health Care Center, 2004     | <b>41</b>   |
| <b>Table 6:</b>  | Estimated Monthly Quantity of Solid Waste Produced from Health Care Center in the Palestinian Territory by Type of Health Care Center and Region, 2004                             | <b>42</b>   |
| <b>Table 7:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Separation and type of Separation, Region and Type of Health Care Center, 2004 | <b>42</b>   |
| <b>Table 8:</b>  | Percentage of Health Care Center in the Palestinian Territory by Type of Separated Waste, Region and Type of Health Care Center, 2004  | <b>43</b>   |
| <b>Table 9:</b>  | Estimated Monthly Quantity of Separated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004                                | <b>44</b>   |
| <b>Table 10:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where General Waste Put in, Region and Type of Health Care Center, 2004                       | <b>44</b>   |
| <b>Table 11:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Infectious Waste Put in, Region and Type of Health Care Center, 2004                    | <b>45</b>   |
| <b>Table 12:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Sharp Waste Put in, Region and Type of Health Care Center, 2004                         | <b>45</b>   |
| <b>Table 13:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Non Separated Solid Waste Put in, Region, and Type of Health Care Center, 2004          | <b>46</b>   |

| <b>Table</b>  | <b>Page</b> |
|---|-------------|
| <b>Table 14:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of General waste, Infectious waste and Sharp waste, Region and Type of Health Care Center, 2004     | <b>47</b>   |
| <b>Table 15:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of Non Separated Waste, Region and Type of Health Care Center, 2004                                 | <b>48</b>   |
| <b>Table 16:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of General waste, Infectious waste and Sharp waste Collection, Region and Type of Health Care Center, 2004 | <b>49</b>   |
| <b>Table 17:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of Non-Separated Solid Waste Collection, Region and Type of Health Care Center, 2004                       | <b>50</b>   |
| <b>Table 18:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Waste Treatment, Type of Treatment, Region and Type of Health Care Center, 2004                                  | <b>51</b>   |
| <b>Table 19:</b> Estimated Monthly Quantity of Treated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004  | <b>52</b>   |
| <b>Table 20:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Treatment, Doer of Treatment, Region and Type of Health Care Center, 2004                            | <b>52</b>   |
| <b>Table 21:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Mean inside the Health Care Center, Region and Type of Health Care Center, 2004                    | <b>53</b>   |
| <b>Table 22:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Material Construction, Region and Type of Health Care Center, 2004  | <b>54</b>   |
| <b>Table 23:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Volume, Region and Type of Health Care Center, 2004   | <b>54</b>   |
| <b>Table 24:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Place, Region and Type of Health Care Center, 2004   | <b>55</b>   |
| <b>Table 25:</b> Percent Distribution of Health Care Center in the Palestinian Territory by, Distance Between Health Care Center and Waste Collection Place (m), Region and Type of Health Care Center, 2004              | <b>55</b>   |
| <b>Table 26:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Doer of Transporting Solid Waste, Region and Type of Health Care Center, 2004   | <b>56</b>   |



| <b>Table</b>     |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Table 27:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Waste Final Disposal Place, Region and Type of Health Care Center, 2004  | <b>56</b>   |
| <b>Table 28:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Weekly Periodicity of Final Disposal of Waste, Region and Type of Health Care Center, 2004                           | <b>57</b>   |
| <b>Table 29:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Consumed Water Quantity in the Health Care Center, Region and Type of Health Care Center, 2004 | <b>57</b>   |
| <b>Table 30:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Wastewater Treatment in Health Care Center, Region and Type of Health Care Center, 2004        | <b>58</b>   |
| <b>Table 31:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Separation in Health Care Center, Region and Type of Health Care Center, 2004      | <b>58</b>   |
| <b>Table 32:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Treatment in Health Care Center, Region and Type of Health Care Center, 2004       | <b>59</b>   |



## List of Figures

| <b>Figure</b>    |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Figure 1:</b> | Estimated Monthly Quantity of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004                     | [23]        |
| <b>Figure 2:</b> | Percent Distribution of Health Care Center by the Method of Wastewater Disposal and Type of Center, 2004                            | [24]        |
| <b>Figure 3:</b> | Estimated Monthly Quantity of Health Care Waste Produced from Health Care Center by Type of Center, 2004                            | [24]        |
| <b>Figure 4:</b> | Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004   | [25]        |
| <b>Figure 5:</b> | Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004 | [26]        |
| <b>Figure 6:</b> | Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004             | [26]        |



## **Executive Summary**

The estimated monthly quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in health care centers in Gaza Strip.

The result show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

The result show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and the percentage of the secondary health care centers that do not treat wastewater is 93.2%.

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 381 tons and 5.8 thousands cubic meter including 275 tons and 1.9 thousands cubic meter in the West Bank and 106 tons and 3.9 thousands cubic meter in Gaza Strip. 49.0% of the health care centers in the Palestinian Territory perform separation of health care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components.

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

## Chapter One

### **Introduction**

Environmental statistics in the health care centers is very interested and this statistics is an important instrument to make decisions, planning, and draw the outlines for environment. And relating to infrequency of data about this subject in the Palestinian Territory, the Palestinian Central Bureau of Statistics (PCBS) building up and develop a database about environmental in the health care centers.

The sources of the data in this report are Health Care Environment Survey 2004 (for the data about governmental and non-governmental organizations sectors), and Economical Environmental Survey 2004 (for the data about private sector).

#### **1.1 Objectives of the Report**

The main objective of this report is to make overview about the main indicators of environment in the health care centers in three sectors (governmental, non-governmental organizations and private sector), which including:

- Water consume.
- management of wastewater.
- management of health Care waste.
- Problems faced Health care centers During Intifada.

#### **1.2 Report Structure**

This report consists of five chapters: the first chapter presents introduction, the report objectives and the report structure, the second chapter describes the definitions and explanations, the third chapter briefly describes the main findings, while the fourth chapter presents the methodology used in the survey, consisting the questionnaire design, sampling design, fieldwork operations and data processing, the last chapter includes an assessment of data quality and technical notes



## Chapter Two

### Concepts and Definitions

|   |  |
|---|--|
| <b>Biological Treatment:</b>                        | Wastewater treatment employing aerobic and anaerobic microorganisms that results in decanted effluents and Separate sludge Containing microbial mass together with pollutants. Biological treatment processes are also used in combination or in conjunction with mechanical and advanced unit operations. |
| <b>Cesspit:</b>                                     | A well or a pit in which night soil and other refuse is stored, constructed with either tight or porous walls.   |
| <b>Chemical Disinfection:</b>                       | Chemicals used for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Chemical Treatment:</b>                          | Treatment methods that are used to effect the complete breakdown of hazardous Waste in to non-toxic gases or, more frequently, to modify the chemical properties of the Waste, for example, through reduction of water solubility or neutralization of acidity or alkalinity.                              |
| <b>Chemical Waste:</b>                              | May be hazardous – toxic, corrosive, flammable, reactive or genotoxic (capable of altering genetic material), or non-hazardous.  |
| <b>Clinical Waste (Health Care Waste):</b>          | Any waste coming out of health Care provided in hospitals or other health care centers. However the definition does not include health Care waste resulting from health care at home.  |
| <b>Disinfection:</b>                                | Effective killing by chemical and physical processes of all organisms capable of causing infectious diseases.  |
| <b>Dumping Site:</b>                                | Site used to dispose of solid wastes without environmental control.  |
| <b>General waste:</b>                               | All non hazardous waste, similar in nature to domestic waste   |
| <b>Hospital waste:</b>                              | Waste coming out of hospitals. Such waste is around 85 % non-hazardous, around 10 % are infectious, around 5% non-infectious but hazardous.  |
| <b>Incineration (Dry Thermal Disinfection):</b>     | Controlled burning of solid, liquid or gaseous waste materials at high temperatures.   |
| <b>Infectious Waste:</b>                            | All kinds of waste, which may transmit viral, bacterial or parasitic diseases to human beings. It includes infectious animal waste from laboratories, slaughter- houses, veterinary practices and so on.   |
| <b>Irradiation:</b>                                 | Use of radiation (X rays, or gamma rays) for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Mechanical Treatment (of Health Care waste):</b> | Crush, break, cut or otherwise damage of sharps prior to treatment.  |



|  |  |
|--|--|
| <b>Mechanical Treatment (of Wastewater):</b> | Wastewater treatment of physical and mechanical nature that results in decanted effluents and Separate Sludge. Mechanical treatment processes are also used in combination with biological and advanced unit operations. Mechanical treatment includes Processes such as sedimentation and flotation.                        |
| <b>Open burning:</b>                         | Out door burning of wastes such as lumber, scrapped cars, textiles, sawdust and so forth.  |
| <b>Pharmaceutical Waste:</b>                 | This includes pharmaceutical products, drugs and chemicals, which have been returned from wards, have been spilled or soiled, are out of date or contaminated, or are to be discarded for any reason.  |
| <b>Primary Health Care Center:</b>           | Health center offers preventive care (diagnostic and curative) before illness case is complicated.   |
| <b>Radioactive Waste:</b>                    | Material that contains or is contaminated with radionuclides at concentrations greater than those established as “exempt” by the competent authorities. To avoid persistent harmful effects, long-term storage is necessary, for which purpose so-called “isotope cemeteries” and abandoned quarries are used.               |
| <b>Secondary Health Care Center:</b>         | Health center offers curative and nursing health care for illness case exceeding Primary Health Care.  |
| <b>Separation (Segregation):</b>             | The system separation of solid waste into designated categories  |
| <b>Sewage Network:</b>                       | System of collectors, pipelines, conduits and pumps to evacuate wastewater (rainwater, domestic and other wastewater) from any of the location paces generation either to municipal sewage treatment plant or to a location place where wastewater is discharged.  |
| <b>Sharps:</b>                               | Any item that could cause a cut or puncture (especially needles and blades).   |
| <b>Solid Waste Disposal:</b>                 | Ultimate deposition or placement of refuse that is not salvaged or recycled.   |
| <b>Solid Waste:</b>                          | Useless and sometimes hazardous material with low liquid content, solid wastes include municipal garbage, industrial and commercial waste, sewage sludge, wastes resulting from agricultural and animal husbandry operations and other connected activities, demolition wastes and mining residues                           |
| <b>Storage (of the Health Care Waste):</b>   | The containment of health care waste in manner that dose not constitute disposal of the health care waste.   |
| <b>Transport of the Health Care Waste:</b>   | The movement of the health care waste from the point of generation to any intermediate point and finally to the point of treatment or disposal. Transport does not include the movement of health care waste from a health facility or agency to another health facility or agency for the purposes of testing and research. |

**Treatment of the Health Care Waste:** Processes that modify the waste in some way before it is taken to its final resting place.

**Waste Collection:** Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or governmental and non-governmental corporations, specialized enterprises or general government. Collection of municipal waste may be selective, that's to say carried out for a specific type of product, or undifferentiated, in other words, covering all kinds of waste at the same time.

**Wastewater Treatment:** Process to render wastewater fit to meet environmental standards or other quality norms. Three broad types of treatment may be distinguished: mechanical, biological, and advanced.

**Wastewater:** Used water, typically discharged into the sewage system. It contains matter and bacteria in solution or suspension.

**Wet Thermal Disinfections:** Autoclaving at 160 Co under high pressure to effective killing of all organisms capable of causing infectious diseases.

**Symbols Used in Tables:**

(-) Not available

(0) less than half of the unit



## Main Findings

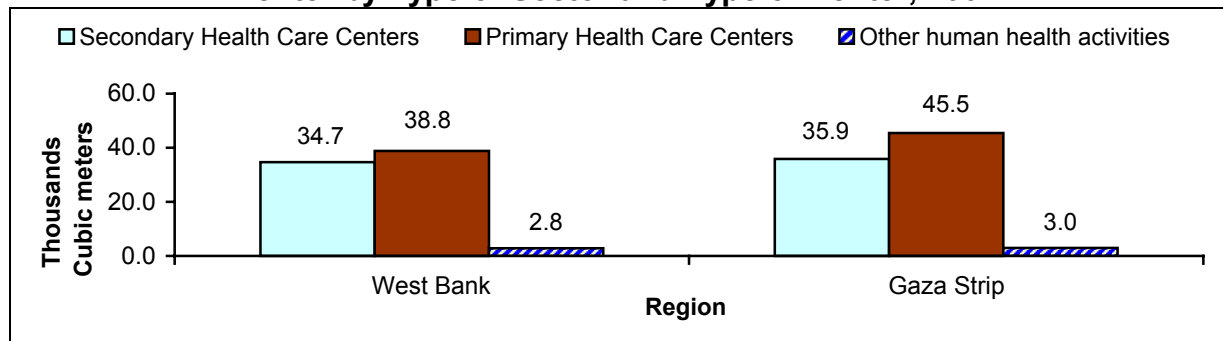
This section presents the main findings of the Care Environment Survey 2004 and data for private health care sector which come from Economical Environmental Survey 2004. Statistical results are classified according to the main components of environmental elements in the governmental and non-governmental health care centers, including water, health care waste, and wastewater.

### 3.1 Water:

#### Consumption:

The estimated quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in Gaza Strip.

**Figure 1: Estimated Monthly Quantities of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004**



#### Sources of Water Supply:

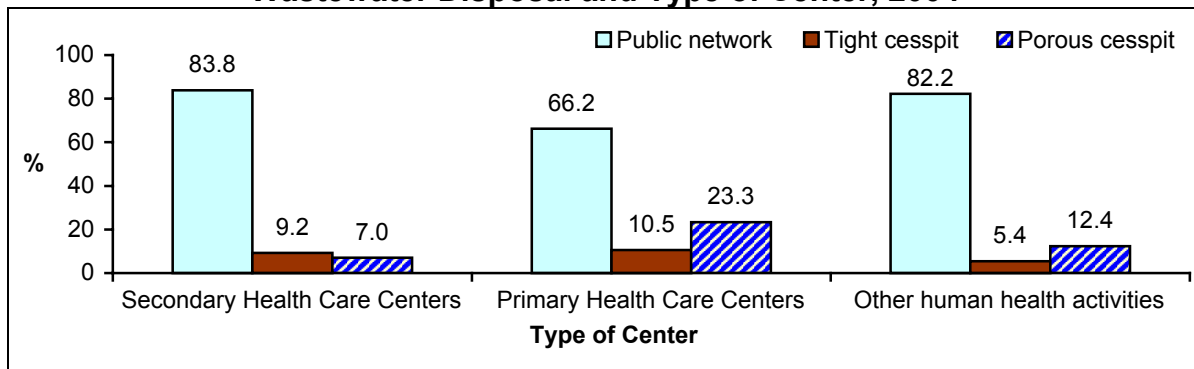
The results show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

### 3.2 Wastewater:

#### Disposal Methods:

The results show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and 9.9% of the health care centers use tight cesspit. Also 21.4% of the health care centers use porous cesspit.

**Figure 2: Percent Distribution of Health Care Centers by the Method of Wastewater Disposal and Type of Center, 2004**



**Treatment of Wastewater:**

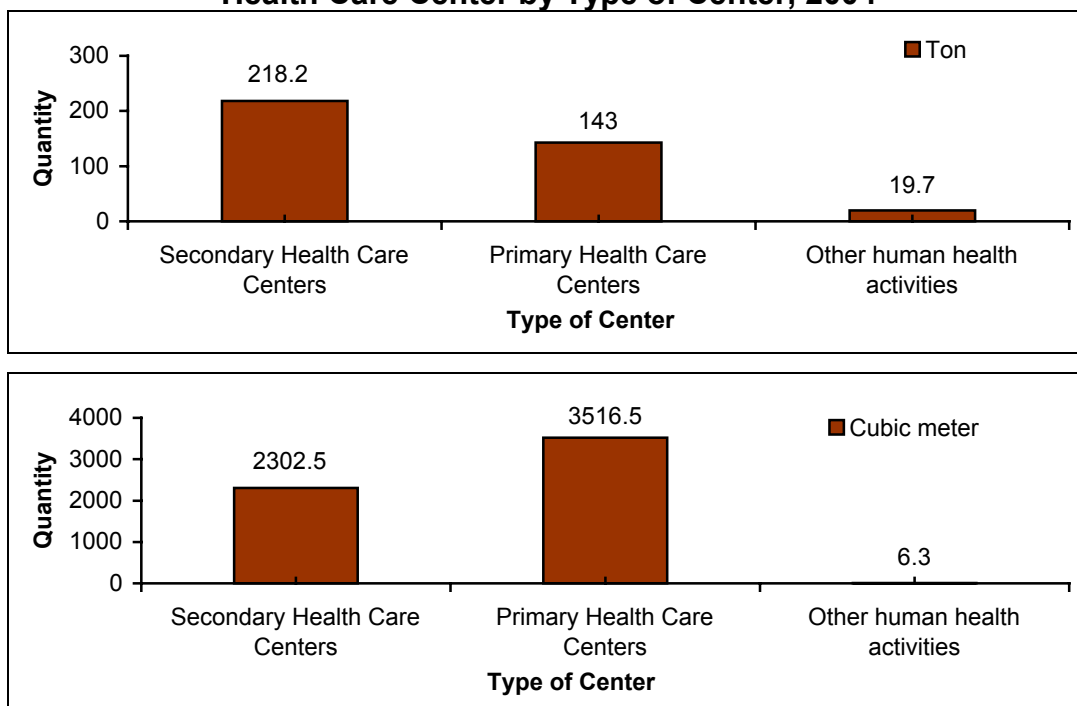
The percentage of the secondary health care centers that do not treat wastewater is 93.2%, 99.3% of primary the health care centers and 99.2% of other human health activities. The main treatment methods used are the mechanical, the chemical treatments and biological treatment.

**3.3 Health Care Solid Waste:**

**Quantity:**

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 380.9 tons and 5.8 thousands cubic meter including 274.8 tons and 1.9 thousands cubic meter in the West Bank and 106.1 tons and 3.9 thousands cubic meter in Gaza Strip. While the total estimated quantities produced by the secondary health care centers in the Palestinian Territory were about 218.2 tons and 2.3 thousands cubic meter.

**Figure 3: Estimated Monthly\* Quantities of Health Care Waste Produced from Health Care Center by Type of Center, 2004**



\* The quantities estimated by using two units, cubic meter and ton

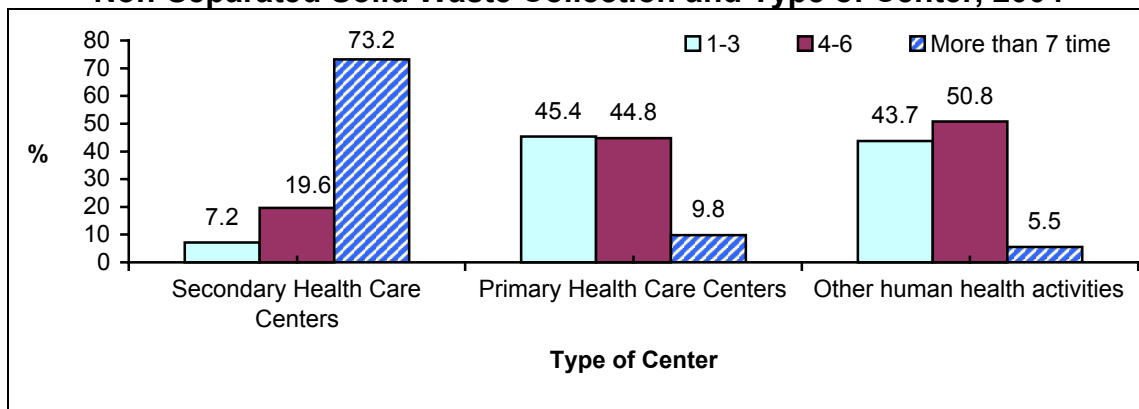
### Separation:

49.0% of the health care centers in the Palestinian Territory perform separation of health Care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components. However, the percentage of the health care centers that perform separation is 58.4% separate General waste, whereas 55.4% of the health care centers separate Infectious waste. The quantities of separated waste in the health care centers were estimated at 145.2 tons and 83.3 cubic meter.

In the Centers that perform waste separation and package the separated waste, the packaging depends on the type of the separated waste. Nylon bags are used for packaging the General waste in 54.7% of the health care centers in the Palestinian Territory, while Plastic boxes are used for packaging the Infectious waste in 37.3% of the health care centers. 76.5% of the health care centers used nylon bags to packaging the non-separated waste.

The periodicity of collecting health care waste is from 4 to 6 times per week in 59.0% of the health care centers. The non-separated waste in the health care centers was collected from 4 to 6 times per week in 44.9% of the health care centers.

**Figure 4: Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004**



### Transportation:

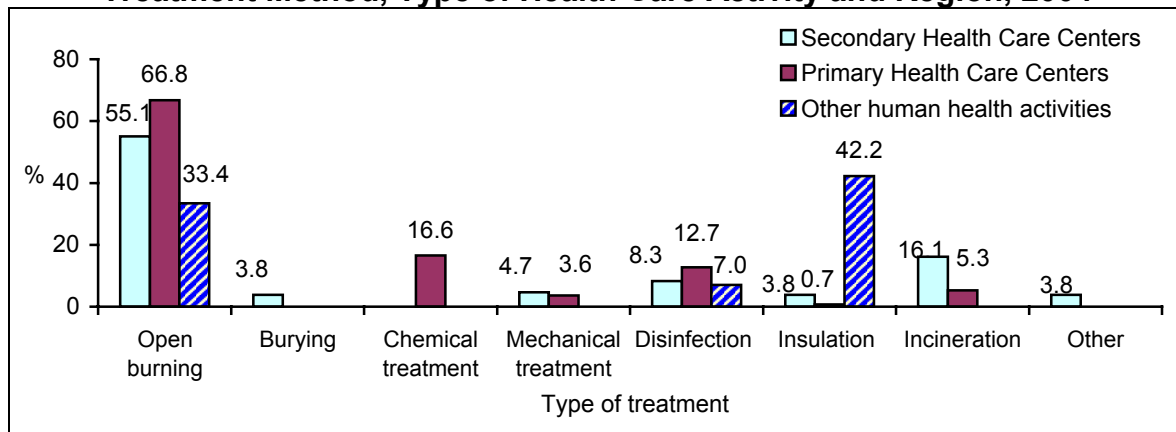
The transportation in the health care centers in the Palestinian Territory that perform separation of General waste is done manually in 96.7% of the health care centers, and 1.9% of the health care centers use special carriages, in otherwise is done manually for Infectious waste in 97.0%, and 1.1% of the health care centers use special carriages. While in the Centers that do not perform separation of waste, the waste was transported manually in 96.3% of the health care centers and using special carriages in 2.2% of the health care centers.

### Treatment:

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health Care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The most important treatment method is the open burning in 64.2% of the health care centers, and 14.7% of them use chemical treatment, and 8.3% used disinfection. The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

**Figure 5: Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004**



**Disposal:**

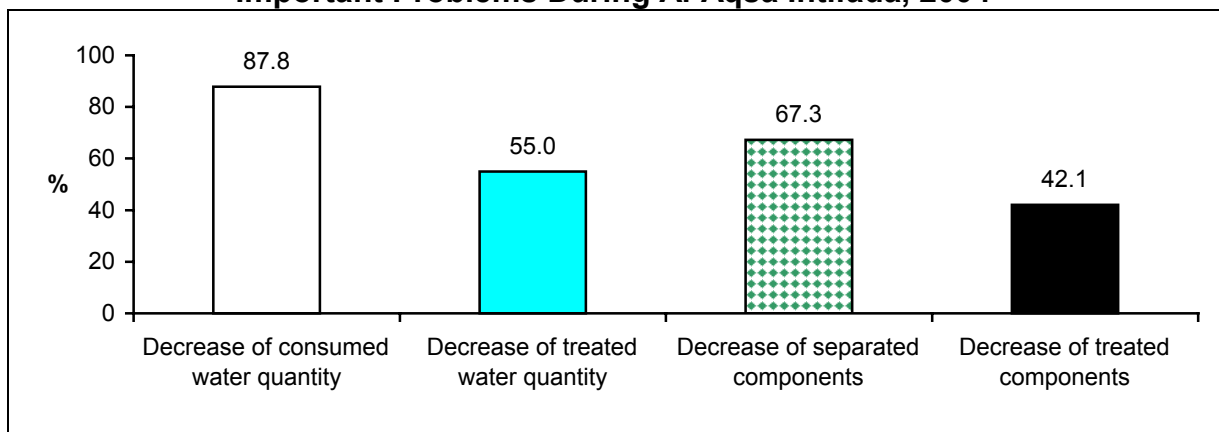
In this stage, the waste is compiled in a place then transferred to a place of final disposal. 61.7% of the health care centers compile waste in a local authority open container, 9.7% of the health care centers in containers local authority closed container, and 5.6% of the health care centers in health care center open container, while 3.9% of the health care centers in health care center closed container and 19.1% of the health care center don't use a container, and 86.0% of used containers made from metal.

The local authority transfers the waste to a place of final disposal in 83.1% of the health care centers. The place of final disposal was a dumping site owned by the local authority for 84.7% of the health care centers in the Palestinian Territory. The periodicity of waste final disposal was 4 to 6 times per week for 53.7% of the health care centers.

**3.4 Problems faced Health care centers During Intifada:**

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

**Figure 6: Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004**



## Methodology

### 4.1 The Survey Questionnaire:

The environmental questionnaire was designed in accordance with the similar country experiments and according to international standards and recommendations for the most important indicators, taking into account the special situation of Palestinian Territory.

### Test the Questionnaire:

To test the questionnaire we take the results of the last surveys that implemented by the PCBS in 2000, 2001 as a pretest; consequently some modifications were made on the questionnaire and on the instructions.

### 4.2 Sampling and Sampling Frame:

#### Target Population:

The target population of this survey is all health care centers in the Palestinian Territory, and they divide to:

1. Governmental health care centers (Ministry of Health, Health Care Military Service, Lijan Azakah).
2. Non-governmental health care centers (Health Union Committees, Union of Palestine Health Care Relief Committees, Refits Friends Benevolent Society, UNRWA, Red Crescent Society, and Red Cross) in the Palestinian Territory.
3. Private health care sector.

#### Sampling Frame:

The sampling frame was based on by type of health care centers:

1. **Private Health Care Sector:** The general frame for the establishments which finding of the 1997 Center Census conducted by PCBS, which was updated annually by the updating frame survey 2002.
2. **Governmental and Non-governmental Health care centers:** The frame of the all centers which work in sector of health care which owned by Governmental and Non-governmental health care centers updated annually by thru the administration records in the PCBS.

#### Sample size:

This section is only for the privet sector data, which implemented by using a sample, and the sample size was 285 privet health care center in the Palestinian Territory. It was distributed according to the economic activities into 44 centers of hospital activities, 165 centers of medical and dental practice activities, 76 centers of other human health activities.

#### Sample Design:

The sample of Economical Environmental Survey 2004 is a single-stage stratified cluster random sample.



### **4.3 Field Work:**

The Field Work is the real work to get the demanded data from the primary source, and guarantee a good orthopedist for this stage is the main affair which works on in this stage.

The data in this report come from two sources and each one have a method to collect data about the health care centers.

The data which come from Health Care Environment Survey 2004 collecting by the administrative record team, where they apportion the questionnaires to the respondents to filed by them himself.

And about the data which come from Economical Environmental Survey 2004 collecting by field workers, and this type of collection method must be pass on tow stage:

1. Training Fieldworkers on the main skills before the start of data collection.
2. Distribution the team of Fieldworkers to groups.

### **4.4 Data Processing:**

The data processing stage consisted of the following operations:

#### **Editing before data entry:**

All questionnaires were edited again in the office using the same instructions adopted for editing in the fields.

#### **Data entry:**

In this stage data were entered into the computer, using Microsoft Access. The data entry program was prepared to satisfy a number of requirements such as:

- Duplication of the questionnaire on the computer screen.
- Logical and consistency check of data entered.
- Possibility for internal editing of questions answers.
- Maintaining a minimum of digital data entry and fieldwork errors.
- User-Friendly handling.
- Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SAS and SPSS.

## Chapter Five

### Data Quality

Two types of errors affect the quality of survey data; statistical and non-statistical errors.

#### 5.1 Statistical Errors

This type of errors could be determined easily, and it is result from sampling errors, and this type of errors concern the data of private health care centers. And to reduce this errors the data mast pass tow stage:

#### Estimations Procedure

It is necessary, when calculating the estimations of the survey indicators, to calculate the weights of the establishments. The weight of an establishment is the mathematical inverse of choosing it.

#### Calculation of Variances

Variance is change from a variable to another, it depends on:

1. The sample size
2. The actual variance for all the population units
3. the sample design

The variance for a number of variables was calculated using CENVAR

#### 5.2 Non-Statistical Errors

This type of errors result from non-sampling errors, and could not be determined easily due to the diversity of sources (e.g. the interviewers, respondent, editor, data entry operator... etc).

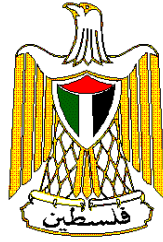
However, several measures were adopted to minimize the effects of these errors. The interviewers, editors and coders had undergone intensive training and were provided with fieldwork manuals to consult when facing any problem.

The data entry program was designed in a way that allows error detection and correction. This applies particularly to logical errors that might not be discovered before data entry operations. A consistency check was also performed to assure accuracy after data entry.



## References

1. Palestinian Central Bureau of Statistics, 1996. *Stander industrial Classification of all Economic Activities for West Bank and Gaza Strip (PISIC)*. Ramallah- Palestine.
2. Palestinian Central Bureau of Statistics, 2000. *Medical Environmental Survey 2000, Main Finding*. Ramallah- Palestine.
3. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers in Private Sector 2001, Main Finding*. Ramallah- Palestine.
4. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers 2001, Main Finding*. Ramallah- Palestine.
5. Palestinian Central Bureau of Statistics, 2003. *Environmental Survey for Health Care Centers 2003, Main Finding*. Ramallah- Palestine.
6. Palestinian Central Bureau of Statistics, 2003. *Environmental Economic Survey-2003: Main Findings*: Ramallah- Palestine.
7. Palestinian Central Bureau of Statistics, 2004. *Environmental Economic Survey-2004: Main Findings*: Ramallah- Palestine.
8. World Health Organization, 1994. *Managing Health Care Waste in Developing Countries*, Geneva - Switzerland.
9. World Health Organization, 1999. *Safe management of waste form health-care activities*, Dr Adrian Coad.
10. United Nations, 1997. *Glossary of Environment Statistics. Series F, NO.67*. New York- USA.



# **Palestinian Central Bureau of Statistics**

## **Environmental Survey for Health Care Centers, 2004 Main Findings**

**December, 2004**

“ Cover Price US \$ 3”

PAGE NUMBERS OF ENGLISH TEXT ARE PRINTED IN SQUARE BRACKETS.  
TABLES ARE PRINTED IN THE ARABIC ORDER (FROM RIGHT TO LEFT).

© December, 2004  
**All Rights Reserved**

**Suggested Citation:**

**Palestinian Central Bureau of Statistics, 2004.** *Environmental Survey for Health Care Centers, 2004: Main Findings.* Ramallah - Palestine.

All correspondence should be directed to:  
Dissemination and Documentation Department/ Division of user services  
**Palestinian Central Bureau of Statistics**  
**P.O.Box 1647, Ramallah, Palestine.**

Tel: (972/970) 2 2406340  
E-mail: [diwan@pcbs.gov.ps](mailto:diwan@pcbs.gov.ps)

Fax: (972/970) 2 2406343  
Web-site: <http://www.pcbs.gov.ps>

## **Acknowledgment**

**The Palestinian Central Bureau of Statistics (PCBS) expresses its gratitude to the Ministry of Health and to All non-Governmental Organizations working in the Health Care Sector and all Private Health Care Sector for their cooperation.**

**Financial support for the Environmental Survey for Health Care Centers at the PCBS is being provided by the Palestinian National Authority (PNA) and the Core Funding Group (CFG) represented by The Representative Office of Norway to the PNA; The Representative Office of the Netherlands to PNA; Swiss Agency for Development and Cooperation (SDC); UK Department for International Development (DFID); The European Commission (EC); and The World Bank (WB).**

**On this occasion, the PCBS extends special thanks to the Core Funding Group (CFG) for this support.**





## **Preface**

As the attention towards environment and the risk of environmental pollution increase, environment statistics become one of the basic fields in the official statistics. The Health Care waste statistics is an important subject in the environment statistics due to its negative effects on the health and the environment if not disposed properly. Many decisions depend on such statistics, especially in Palestinian Territory where statistics about it is not available.

The Palestinian Central Bureau of Statistics (PCBS) seeks to provide such data through its program for environment statistics that aims at building and updating a comprehensive and accurate statistical database on all environmental subjects. This program aims to provide statistical data as a tool for monitoring and management of the environmental status in the Palestinian Territory.

This report is one of a series of reports that are being published by the PCBS on the Palestinian environment. The report presents the most important Health Care waste statistics for the private sector indicators as collected from different sources.

This report concentrates on the variables of water consumption, Health Care waste collection, separation and disposal, and wastewater disposal in the Governmental and non-Governmental Health Care Centers.

PCBS hopes that the findings of this report will be a reference for planners and decision-makers towards improving the environmental status in the Palestinian Territory.

**December, 2004**

**Hasan Abu-Libdeh, Ph.D.  
President**



## Table of Contents

| <b>Subject</b>   | <b>Page</b> |
|--|-------------|
| List of Tables   |             |
| List of Figures  |             |
| Executive Summary  |             |
| Chapter One: <b>Introduction</b>                           | <b>[17]</b> |
| 1.1 Objectives of the Report                               | [17]        |
| 1.2 Report Structure                                       | [17]        |
| Chapter Two: <b>Definitions and Explanations</b>           | <b>[19]</b> |
| Chapter Three: <b>Main Findings</b>                        | <b>[23]</b> |
| 3.1 Water  | [23]        |
| 3.2 Wastewater   | [23]        |
| 3.3 Health Care Solid Waste                                | [24]        |
| 3.4 Problems Faced Health Care Centers During the Intifada | [26]        |
| Chapter Four: <b>Methodology</b>                           | <b>[27]</b> |
| 4.1 The Survey Questionnaire                               | [27]        |
| 4.2 Sampling and Sampling Frame                            | [27]        |
| 4.3 Field Work   | [28]        |
| 4.4 Data Processing  | [28]        |
| Chapter Five: <b>Data Quality</b>                          | <b>[29]</b> |
| 5.1 Statistical Errors                                     | [29]        |
| 5.2 Non-Statistical Errors                                 | [29]        |
| <b>References</b>  | <b>[31]</b> |
| <b>Tables</b>  | <b>37</b>   |



## List of Tables

| <b>Table</b>     |  | <b>Page</b> |
|------------------|--|-------------|
| <b>Table 1:</b>  | Main Selected Indicators about the Activity of the Health care center in the Palestinian Territory from Environmental Sides for the Years 2003 and 2004                            | <b>39</b>   |
| <b>Table 2:</b>  | Estimated Monthly Quantity of Water Consumed in the Palestinian Territory from Health Care Center by Type of Health Care Center and Region, 2004                                   | <b>40</b>   |
| <b>Table 3:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Means of Obtaining Water, Region and Type of Health Care Center, 2004                                   | <b>40</b>   |
| <b>Table 4:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Wastewater Disposal Method, Region and Type of Health Care Center, 2004                                 | <b>41</b>   |
| <b>Table 5:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Wastewater Treatment, Method of Treatment, Region and Type of Health Care Center, 2004     | <b>41</b>   |
| <b>Table 6:</b>  | Estimated Monthly Quantity of Solid Waste Produced from Health Care Center in the Palestinian Territory by Type of Health Care Center and Region, 2004                             | <b>42</b>   |
| <b>Table 7:</b>  | Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Separation and type of Separation, Region and Type of Health Care Center, 2004 | <b>42</b>   |
| <b>Table 8:</b>  | Percentage of Health Care Center in the Palestinian Territory by Type of Separated Waste, Region and Type of Health Care Center, 2004  | <b>43</b>   |
| <b>Table 9:</b>  | Estimated Monthly Quantity of Separated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004                                | <b>44</b>   |
| <b>Table 10:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where General Waste Put in, Region and Type of Health Care Center, 2004                       | <b>44</b>   |
| <b>Table 11:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Infectious Waste Put in, Region and Type of Health Care Center, 2004                    | <b>45</b>   |
| <b>Table 12:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Sharp Waste Put in, Region and Type of Health Care Center, 2004                         | <b>45</b>   |
| <b>Table 13:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Non Separated Solid Waste Put in, Region, and Type of Health Care Center, 2004          | <b>46</b>   |

| <b>Table</b>  | <b>Page</b> |
|---|-------------|
| <b>Table 14:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of General waste, Infectious waste and Sharp waste, Region and Type of Health Care Center, 2004     | <b>47</b>   |
| <b>Table 15:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of Non Separated Waste, Region and Type of Health Care Center, 2004                                 | <b>48</b>   |
| <b>Table 16:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of General waste, Infectious waste and Sharp waste Collection, Region and Type of Health Care Center, 2004 | <b>49</b>   |
| <b>Table 17:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of Non-Separated Solid Waste Collection, Region and Type of Health Care Center, 2004                       | <b>50</b>   |
| <b>Table 18:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Waste Treatment, Type of Treatment, Region and Type of Health Care Center, 2004                                  | <b>51</b>   |
| <b>Table 19:</b> Estimated Monthly Quantity of Treated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004  | <b>52</b>   |
| <b>Table 20:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Treatment, Doer of Treatment, Region and Type of Health Care Center, 2004                            | <b>52</b>   |
| <b>Table 21:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Mean inside the Health Care Center, Region and Type of Health Care Center, 2004                    | <b>53</b>   |
| <b>Table 22:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Material Construction, Region and Type of Health Care Center, 2004  | <b>54</b>   |
| <b>Table 23:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Volume, Region and Type of Health Care Center, 2004   | <b>54</b>   |
| <b>Table 24:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Place, Region and Type of Health Care Center, 2004   | <b>55</b>   |
| <b>Table 25:</b> Percent Distribution of Health Care Center in the Palestinian Territory by, Distance Between Health Care Center and Waste Collection Place (m), Region and Type of Health Care Center, 2004              | <b>55</b>   |
| <b>Table 26:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Doer of Transporting Solid Waste, Region and Type of Health Care Center, 2004   | <b>56</b>   |

| <b>Table</b>   | <b>Page</b> |
|--|-------------|
| <b>Table 27:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Waste Final Disposal Place, Region and Type of Health Care Center, 2004  | <b>56</b>   |
| <b>Table 28:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Weekly Periodicity of Final Disposal of Waste, Region and Type of Health Care Center, 2004                           | <b>57</b>   |
| <b>Table 29:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Consumed Water Quantity in the Health Care Center, Region and Type of Health Care Center, 2004 | <b>57</b>   |
| <b>Table 30:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Wastewater Treatment in Health Care Center, Region and Type of Health Care Center, 2004        | <b>58</b>   |
| <b>Table 31:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Separation in Health Care Center, Region and Type of Health Care Center, 2004      | <b>58</b>   |
| <b>Table 32:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Treatment in Health Care Center, Region and Type of Health Care Center, 2004       | <b>59</b>   |





## List of Figures

| <b>Figure</b>    |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Figure 1:</b> | Estimated Monthly Quantity of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004                     | [23]        |
| <b>Figure 2:</b> | Percent Distribution of Health Care Center by the Method of Wastewater Disposal and Type of Center, 2004                            | [24]        |
| <b>Figure 3:</b> | Estimated Monthly Quantity of Health Care Waste Produced from Health Care Center by Type of Center, 2004                            | [24]        |
| <b>Figure 4:</b> | Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004   | [25]        |
| <b>Figure 5:</b> | Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004 | [26]        |
| <b>Figure 6:</b> | Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004             | [26]        |



## **Executive Summary**

The estimated monthly quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in health care centers in Gaza Strip.

The result show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

The result show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and the percentage of the secondary health care centers that do not treat wastewater is 93.2%.

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 381 tons and 5.8 thousands cubic meter including 275 tons and 1.9 thousands cubic meter in the West Bank and 106 tons and 3.9 thousands cubic meter in Gaza Strip. 49.0% of the health care centers in the Palestinian Territory perform separation of health care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components.

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

## Chapter One

### **Introduction**

Environmental statistics in the health care centers is very interested and this statistics is an important instrument to make decisions, planning, and draw the outlines for environment. And relating to infrequency of data about this subject in the Palestinian Territory, the Palestinian Central Bureau of Statistics (PCBS) building up and develop a database about environmental in the health care centers.

The sources of the data in this report are Health Care Environment Survey 2004 (for the data about governmental and non-governmental organizations sectors), and Economical Environmental Survey 2004 (for the data about private sector).

#### **1.1 Objectives of the Report**

The main objective of this report is to make overview about the main indicators of environment in the health care centers in three sectors (governmental, non-governmental organizations and private sector), which including:

- Water consume.
- management of wastewater.
- management of health Care waste.
- Problems faced Health care centers During Intifada.

#### **1.2 Report Structure**

This report consists of five chapters: the first chapter presents introduction, the report objectives and the report structure, the second chapter describes the definitions and explanations, the third chapter briefly describes the main findings, while the fourth chapter presents the methodology used in the survey, consisting the questionnaire design, sampling design, fieldwork operations and data processing, the last chapter includes an assessment of data quality and technical notes



## Chapter Two

### Concepts and Definitions

|   |  |
|---|--|
| <b>Biological Treatment:</b>                        | Wastewater treatment employing aerobic and anaerobic microorganisms that results in decanted effluents and Separate sludge Containing microbial mass together with pollutants. Biological treatment processes are also used in combination or in conjunction with mechanical and advanced unit operations. |
| <b>Cesspit:</b>                                     | A well or a pit in which night soil and other refuse is stored, constructed with either tight or porous walls.   |
| <b>Chemical Disinfection:</b>                       | Chemicals used for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Chemical Treatment:</b>                          | Treatment methods that are used to effect the complete breakdown of hazardous Waste in to non-toxic gases or, more frequently, to modify the chemical properties of the Waste, for example, through reduction of water solubility or neutralization of acidity or alkalinity.                              |
| <b>Chemical Waste:</b>                              | May be hazardous – toxic, corrosive, flammable, reactive or genotoxic (capable of altering genetic material), or non-hazardous.  |
| <b>Clinical Waste (Health Care Waste):</b>          | Any waste coming out of health Care provided in hospitals or other health care centers. However the definition does not include health Care waste resulting from health care at home.  |
| <b>Disinfection:</b>                                | Effective killing by chemical and physical processes of all organisms capable of causing infectious diseases.  |
| <b>Dumping Site:</b>                                | Site used to dispose of solid wastes without environmental control.  |
| <b>General waste:</b>                               | All non hazardous waste, similar in nature to domestic waste   |
| <b>Hospital waste:</b>                              | Waste coming out of hospitals. Such waste is around 85 % non-hazardous, around 10 % are infectious, around 5% non-infectious but hazardous.  |
| <b>Incineration (Dry Thermal Disinfection):</b>     | Controlled burning of solid, liquid or gaseous waste materials at high temperatures.   |
| <b>Infectious Waste:</b>                            | All kinds of waste, which may transmit viral, bacterial or parasitic diseases to human beings. It includes infectious animal waste from laboratories, slaughter- houses, veterinary practices and so on.   |
| <b>Irradiation:</b>                                 | Use of radiation (X rays, or gamma rays) for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Mechanical Treatment (of Health Care waste):</b> | Crush, break, cut or otherwise damage of sharps prior to treatment.  |

|  |  |
|--|--|
| <b>Mechanical Treatment (of Wastewater):</b> | Wastewater treatment of physical and mechanical nature that results in decanted effluents and Separate Sludge. Mechanical treatment processes are also used in combination with biological and advanced unit operations. Mechanical treatment includes Processes such as sedimentation and flotation.                        |
| <b>Open burning:</b>                         | Out door burning of wastes such as lumber, scrapped cars, textiles, sawdust and so forth.  |
| <b>Pharmaceutical Waste:</b>                 | This includes pharmaceutical products, drugs and chemicals, which have been returned from wards, have been spilled or soiled, are out of date or contaminated, or are to be discarded for any reason.  |
| <b>Primary Health Care Center:</b>           | Health center offers preventive care (diagnostic and curative) before illness case is complicated.   |
| <b>Radioactive Waste:</b>                    | Material that contains or is contaminated with radionuclides at concentrations greater than those established as “exempt” by the competent authorities. To avoid persistent harmful effects, long-term storage is necessary, for which purpose so-called “isotope cemeteries” and abandoned quarries are used.               |
| <b>Secondary Health Care Center:</b>         | Health center offers curative and nursing health care for illness case exceeding Primary Health Care.  |
| <b>Separation (Segregation):</b>             | The system separation of solid waste into designated categories  |
| <b>Sewage Network:</b>                       | System of collectors, pipelines, conduits and pumps to evacuate wastewater (rainwater, domestic and other wastewater) from any of the location paces generation either to municipal sewage treatment plant or to a location place where wastewater is discharged.  |
| <b>Sharps:</b>                               | Any item that could cause a cut or puncture (especially needles and blades).   |
| <b>Solid Waste Disposal:</b>                 | Ultimate deposition or placement of refuse that is not salvaged or recycled.   |
| <b>Solid Waste:</b>                          | Useless and sometimes hazardous material with low liquid content, solid wastes include municipal garbage, industrial and commercial waste, sewage sludge, wastes resulting from agricultural and animal husbandry operations and other connected activities, demolition wastes and mining residues                           |
| <b>Storage (of the Health Care Waste):</b>   | The containment of health care waste in manner that dose not constitute disposal of the health care waste.   |
| <b>Transport of the Health Care Waste:</b>   | The movement of the health care waste from the point of generation to any intermediate point and finally to the point of treatment or disposal. Transport does not include the movement of health care waste from a health facility or agency to another health facility or agency for the purposes of testing and research. |

**Treatment of the Health Care Waste:** Processes that modify the waste in some way before it is taken to its final resting place.

**Waste Collection:** Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or governmental and non-governmental corporations, specialized enterprises or general government. Collection of municipal waste may be selective, that's to say carried out for a specific type of product, or undifferentiated, in other words, covering all kinds of waste at the same time.

**Wastewater Treatment:** Process to render wastewater fit to meet environmental standards or other quality norms. Three broad types of treatment may be distinguished: mechanical, biological, and advanced.

**Wastewater:** Used water, typically discharged into the sewage system. It contains matter and bacteria in solution or suspension.

**Wet Thermal Disinfections:** Autoclaving at 160 Co under high pressure to effective killing of all organisms capable of causing infectious diseases.

**Symbols Used in Tables:**

(-) Not available

(0) less than half of the unit





## Main Findings

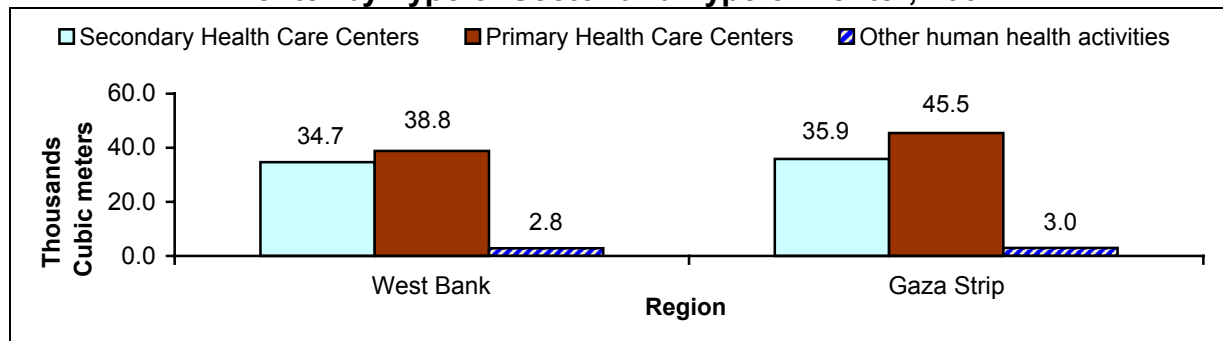
This section presents the main findings of the Care Environment Survey 2004 and data for private health care sector which come from Economical Environmental Survey 2004. Statistical results are classified according to the main components of environmental elements in the governmental and non-governmental health care centers, including water, health care waste, and wastewater.

### 3.1 Water:

#### Consumption:

The estimated quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in Gaza Strip.

**Figure 1: Estimated Monthly Quantities of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004**



#### Sources of Water Supply:

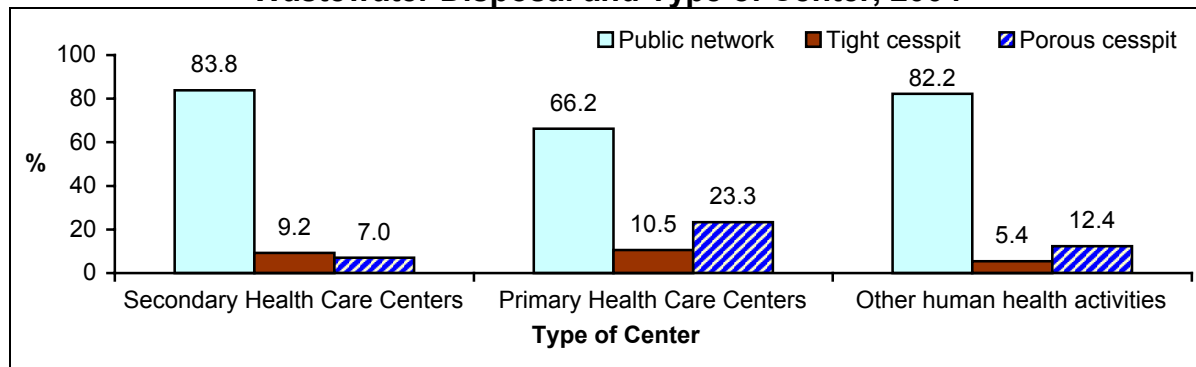
The results show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

### 3.2 Wastewater:

#### Disposal Methods:

The results show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and 9.9% of the health care centers use tight cesspit. Also 21.4% of the health care centers use porous cesspit.

**Figure 2: Percent Distribution of Health Care Centers by the Method of Wastewater Disposal and Type of Center, 2004**



**Treatment of Wastewater:**

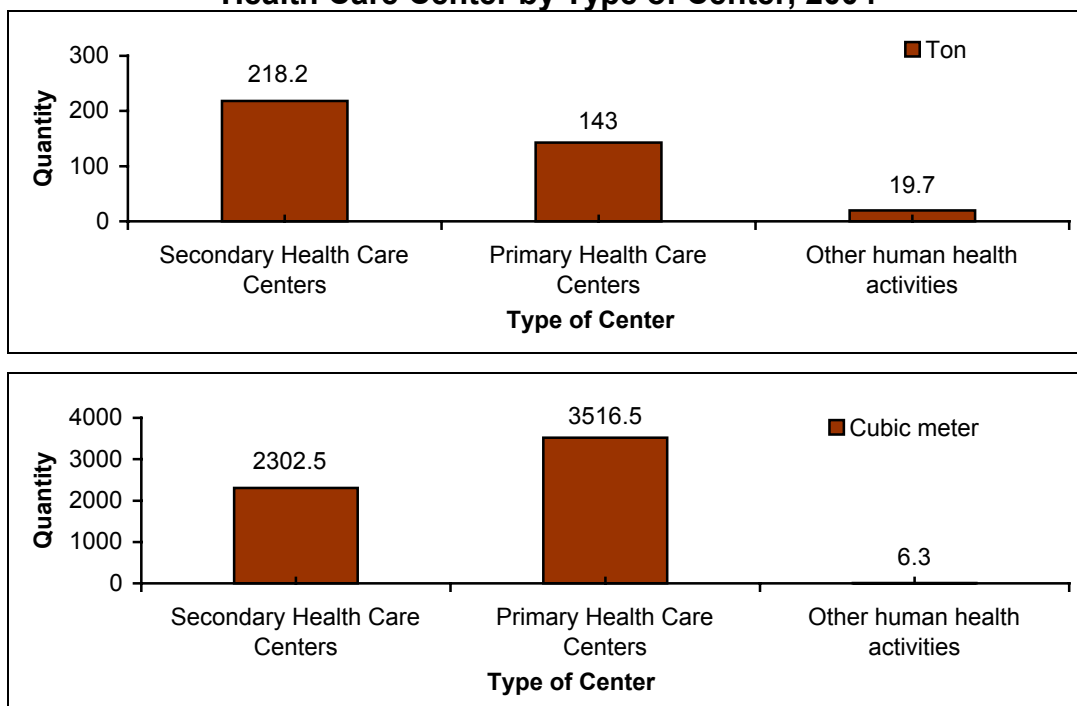
The percentage of the secondary health care centers that do not treat wastewater is 93.2%, 99.3% of primary the health care centers and 99.2% of other human health activities. The main treatment methods used are the mechanical, the chemical treatments and biological treatment.

**3.3 Health Care Solid Waste:**

**Quantity:**

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 380.9 tons and 5.8 thousands cubic meter including 274.8 tons and 1.9 thousands cubic meter in the West Bank and 106.1 tons and 3.9 thousands cubic meter in Gaza Strip. While the total estimated quantities produced by the secondary health care centers in the Palestinian Territory were about 218.2 tons and 2.3 thousands cubic meter.

**Figure 3: Estimated Monthly\* Quantities of Health Care Waste Produced from Health Care Center by Type of Center, 2004**



\* The quantities estimated by using two units, cubic meter and ton

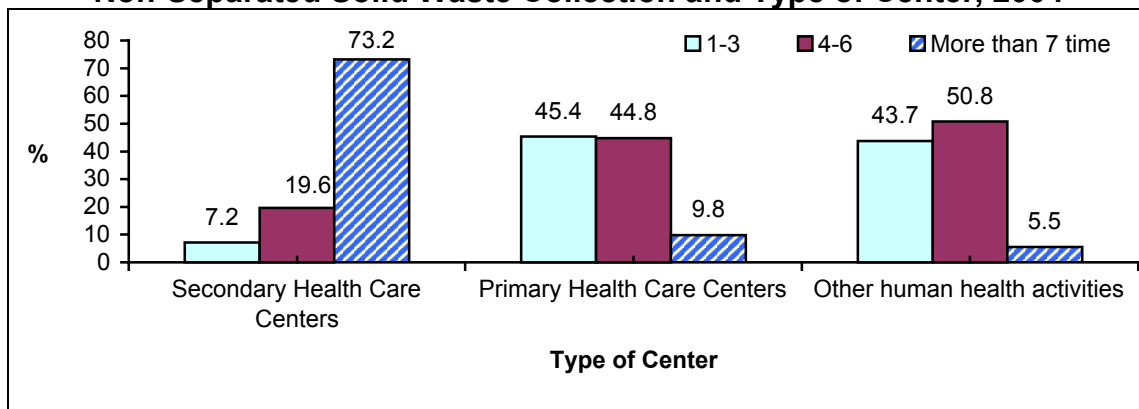
### Separation:

49.0% of the health care centers in the Palestinian Territory perform separation of health Care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components. However, the percentage of the health care centers that perform separation is 58.4% separate General waste, whereas 55.4% of the health care centers separate Infectious waste. The quantities of separated waste in the health care centers were estimated at 145.2 tons and 83.3 cubic meter.

In the Centers that perform waste separation and package the separated waste, the packaging depends on the type of the separated waste. Nylon bags are used for packaging the General waste in 54.7% of the health care centers in the Palestinian Territory, while Plastic boxes are used for packaging the Infectious waste in 37.3% of the health care centers. 76.5% of the health care centers used nylon bags to packaging the non-separated waste.

The periodicity of collecting health care waste is from 4 to 6 times per week in 59.0% of the health care centers. The non-separated waste in the health care centers was collected from 4 to 6 times per week in 44.9% of the health care centers.

**Figure 4: Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004**



### Transportation:

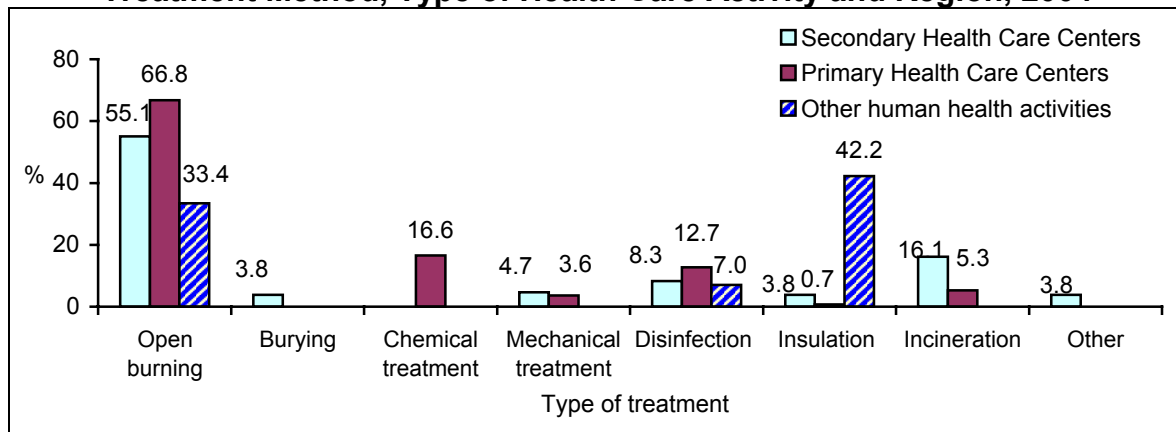
The transportation in the health care centers in the Palestinian Territory that perform separation of General waste is done manually in 96.7% of the health care centers, and 1.9% of the health care centers use special carriages, in otherwise is done manually for Infectious waste in 97.0%, and 1.1% of the health care centers use special carriages. While in the Centers that do not perform separation of waste, the waste was transported manually in 96.3% of the health care centers and using special carriages in 2.2% of the health care centers.

### Treatment:

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health Care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The most important treatment method is the open burning in 64.2% of the health care centers, and 14.7% of them use chemical treatment, and 8.3% used disinfection. The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

**Figure 5: Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004**



**Disposal:**

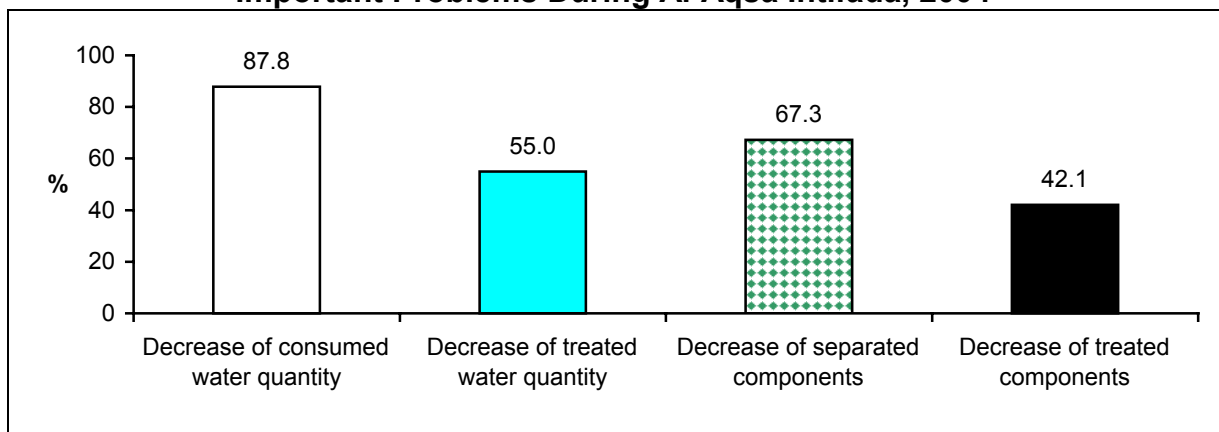
In this stage, the waste is compiled in a place then transferred to a place of final disposal. 61.7% of the health care centers compile waste in a local authority open container, 9.7% of the health care centers in containers local authority closed container, and 5.6% of the health care centers in health care center open container, while 3.9% of the health care centers in health care center closed container and 19.1% of the health care center don't use a container, and 86.0% of used containers made from metal.

The local authority transfers the waste to a place of final disposal in 83.1% of the health care centers. The place of final disposal was a dumping site owned by the local authority for 84.7% of the health care centers in the Palestinian Territory. The periodicity of waste final disposal was 4 to 6 times per week for 53.7% of the health care centers.

**3.4 Problems faced Health care centers During Intifada:**

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

**Figure 6: Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004**



## Methodology

### 4.1 The Survey Questionnaire:

The environmental questionnaire was designed in accordance with the similar country experiments and according to international standards and recommendations for the most important indicators, taking into account the special situation of Palestinian Territory.

### Test the Questionnaire:

To test the questionnaire we take the results of the last surveys that implemented by the PCBS in 2000, 2001 as a pretest; consequently some modifications were made on the questionnaire and on the instructions.

### 4.2 Sampling and Sampling Frame:

#### Target Population:

The target population of this survey is all health care centers in the Palestinian Territory, and they divide to:

1. Governmental health care centers (Ministry of Health, Health Care Military Service, Lijan Azakah).
2. Non-governmental health care centers (Health Union Committees, Union of Palestine Health Care Relief Committees, Refits Friends Benevolent Society, UNRWA, Red Crescent Society, and Red Cross) in the Palestinian Territory.
3. Private health care sector.

#### Sampling Frame:

The sampling frame was based on by type of health care centers:

1. **Private Health Care Sector:** The general frame for the establishments which finding of the 1997 Center Census conducted by PCBS, which was updated annually by the updating frame survey 2002.
2. **Governmental and Non-governmental Health care centers:** The frame of the all centers which work in sector of health care which owned by Governmental and Non-governmental health care centers updated annually by thru the administration records in the PCBS.

#### Sample size:

This section is only for the privet sector data, which implemented by using a sample, and the sample size was 285 privet health care center in the Palestinian Territory. It was distributed according to the economic activities into 44 centers of hospital activities, 165 centers of medical and dental practice activities, 76 centers of other human health activities.

#### Sample Design:

The sample of Economical Environmental Survey 2004 is a single-stage stratified cluster random sample.

### **4.3 Field Work:**

The Field Work is the real work to get the demanded data from the primary source, and guarantee a good orthopedist for this stage is the main affair which works on in this stage.

The data in this report come from two sources and each one have a method to collect data about the health care centers.

The data which come from Health Care Environment Survey 2004 collecting by the administrative record team, where they apportion the questionnaires to the respondents to filed by them himself.

And about the data which come from Economical Environmental Survey 2004 collecting by field workers, and this type of collection method must be pass on tow stage:

1. Training Fieldworkers on the main skills before the start of data collection.
2. Distribution the team of Fieldworkers to groups.

### **4.4 Data Processing:**

The data processing stage consisted of the following operations:

#### **Editing before data entry:**

All questionnaires were edited again in the office using the same instructions adopted for editing in the fields.

#### **Data entry:**

In this stage data were entered into the computer, using Microsoft Access. The data entry program was prepared to satisfy a number of requirements such as:

- Duplication of the questionnaire on the computer screen.
- Logical and consistency check of data entered.
- Possibility for internal editing of questions answers.
- Maintaining a minimum of digital data entry and fieldwork errors.
- User-Friendly handling.
- Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SAS and SPSS.

## Chapter Five

### Data Quality

Two types of errors affect the quality of survey data; statistical and non-statistical errors.

#### 5.1 Statistical Errors

This type of errors could be determined easily, and it is result from sampling errors, and this type of errors concern the data of private health care centers. And to reduce this errors the data mast pass tow stage:

#### Estimations Procedure

It is necessary, when calculating the estimations of the survey indicators, to calculate the weights of the establishments. The weight of an establishment is the mathematical inverse of choosing it.

#### Calculation of Variances

Variance is change from a variable to another, it depends on:

1. The sample size
2. The actual variance for all the population units
3. the sample design

The variance for a number of variables was calculated using CENVAR

#### 5.2 Non-Statistical Errors

This type of errors result from non-sampling errors, and could not be determined easily due to the diversity of sources (e.g. the interviewers, respondent, editor, data entry operator... etc).

However, several measures were adopted to minimize the effects of these errors. The interviewers, editors and coders had undergone intensive training and were provided with fieldwork manuals to consult when facing any problem.

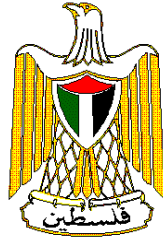
The data entry program was designed in a way that allows error detection and correction. This applies particularly to logical errors that might not be discovered before data entry operations. A consistency check was also performed to assure accuracy after data entry.





## References

1. Palestinian Central Bureau of Statistics, 1996. *Stander industrial Classification of all Economic Activities for West Bank and Gaza Strip (PISIC)*. Ramallah- Palestine.
2. Palestinian Central Bureau of Statistics, 2000. *Medical Environmental Survey 2000, Main Finding*. Ramallah- Palestine.
3. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers in Private Sector 2001, Main Finding*. Ramallah- Palestine.
4. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers 2001, Main Finding*. Ramallah- Palestine.
5. Palestinian Central Bureau of Statistics, 2003. *Environmental Survey for Health Care Centers 2003, Main Finding*. Ramallah- Palestine.
6. Palestinian Central Bureau of Statistics, 2003. *Environmental Economic Survey-2003: Main Findings*: Ramallah- Palestine.
7. Palestinian Central Bureau of Statistics, 2004. *Environmental Economic Survey-2004: Main Findings*: Ramallah- Palestine.
8. World Health Organization, 1994. *Managing Health Care Waste in Developing Countries*, Geneva - Switzerland.
9. World Health Organization, 1999. *Safe management of waste form health-care activities*, Dr Adrian Coad.
10. United Nations, 1997. *Glossary of Environment Statistics. Series F, NO.67*. New York- USA.



# **Palestinian Central Bureau of Statistics**

## **Environmental Survey for Health Care Centers, 2004 Main Findings**

**December, 2004**

“ Cover Price US \$ 3”

PAGE NUMBERS OF ENGLISH TEXT ARE PRINTED IN SQUARE BRACKETS.  
TABLES ARE PRINTED IN THE ARABIC ORDER (FROM RIGHT TO LEFT).

© December, 2004  
**All Rights Reserved**

**Suggested Citation:**

**Palestinian Central Bureau of Statistics, 2004.** *Environmental Survey for Health Care Centers, 2004: Main Findings.* Ramallah - Palestine.

All correspondence should be directed to:  
Dissemination and Documentation Department/ Division of user services  
**Palestinian Central Bureau of Statistics**  
**P.O.Box 1647, Ramallah, Palestine.**

Tel: (972/970) 2 2406340  
E-mail: [diwan@pcbs.gov.ps](mailto:diwan@pcbs.gov.ps)

Fax: (972/970) 2 2406343  
Web-site: <http://www.pcbs.gov.ps>

## **Acknowledgment**

**The Palestinian Central Bureau of Statistics (PCBS) expresses its gratitude to the Ministry of Health and to All non-Governmental Organizations working in the Health Care Sector and all Private Health Care Sector for their cooperation.**

**Financial support for the Environmental Survey for Health Care Centers at the PCBS is being provided by the Palestinian National Authority (PNA) and the Core Funding Group (CFG) represented by The Representative Office of Norway to the PNA; The Representative Office of the Netherlands to PNA; Swiss Agency for Development and Cooperation (SDC); UK Department for International Development (DFID); The European Commission (EC); and The World Bank (WB).**

**On this occasion, the PCBS extends special thanks to the Core Funding Group (CFG) for this support.**



## **Preface**

As the attention towards environment and the risk of environmental pollution increase, environment statistics become one of the basic fields in the official statistics. The Health Care waste statistics is an important subject in the environment statistics due to its negative effects on the health and the environment if not disposed properly. Many decisions depend on such statistics, especially in Palestinian Territory where statistics about it is not available.

The Palestinian Central Bureau of Statistics (PCBS) seeks to provide such data through its program for environment statistics that aims at building and updating a comprehensive and accurate statistical database on all environmental subjects. This program aims to provide statistical data as a tool for monitoring and management of the environmental status in the Palestinian Territory.

This report is one of a series of reports that are being published by the PCBS on the Palestinian environment. The report presents the most important Health Care waste statistics for the private sector indicators as collected from different sources.

This report concentrates on the variables of water consumption, Health Care waste collection, separation and disposal, and wastewater disposal in the Governmental and non-Governmental Health Care Centers.

PCBS hopes that the findings of this report will be a reference for planners and decision-makers towards improving the environmental status in the Palestinian Territory.

**December, 2004**

**Hasan Abu-Libdeh, Ph.D.  
President**





## Table of Contents

| <b>Subject</b>   | <b>Page</b> |
|--|-------------|
| List of Tables   |             |
| List of Figures  |             |
| Executive Summary  |             |
| Chapter One: <b>Introduction</b>                           | <b>[17]</b> |
| 1.1 Objectives of the Report                               | [17]        |
| 1.2 Report Structure                                       | [17]        |
| Chapter Two: <b>Definitions and Explanations</b>           | <b>[19]</b> |
| Chapter Three: <b>Main Findings</b>                        | <b>[23]</b> |
| 3.1 Water  | [23]        |
| 3.2 Wastewater   | [23]        |
| 3.3 Health Care Solid Waste                                | [24]        |
| 3.4 Problems Faced Health Care Centers During the Intifada | [26]        |
| Chapter Four: <b>Methodology</b>                           | <b>[27]</b> |
| 4.1 The Survey Questionnaire                               | [27]        |
| 4.2 Sampling and Sampling Frame                            | [27]        |
| 4.3 Field Work   | [28]        |
| 4.4 Data Processing  | [28]        |
| Chapter Five: <b>Data Quality</b>                          | <b>[29]</b> |
| 5.1 Statistical Errors                                     | [29]        |
| 5.2 Non-Statistical Errors                                 | [29]        |
| <b>References</b>  | <b>[31]</b> |
| <b>Tables</b>  | <b>37</b>   |



## List of Tables

| <b>Table</b>   | <b>Page</b> |
|--|-------------|
| <b>Table 1:</b> Main Selected Indicators about the Activity of the Health care center in the Palestinian Territory from Environmental Sides for the Years 2003 and 2004                            | <b>39</b>   |
| <b>Table 2:</b> Estimated Monthly Quantity of Water Consumed in the Palestinian Territory from Health Care Center by Type of Health Care Center and Region, 2004                                   | <b>40</b>   |
| <b>Table 3:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Means of Obtaining Water, Region and Type of Health Care Center, 2004                                   | <b>40</b>   |
| <b>Table 4:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Wastewater Disposal Method, Region and Type of Health Care Center, 2004                                 | <b>41</b>   |
| <b>Table 5:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Wastewater Treatment, Method of Treatment, Region and Type of Health Care Center, 2004     | <b>41</b>   |
| <b>Table 6:</b> Estimated Monthly Quantity of Solid Waste Produced from Health Care Center in the Palestinian Territory by Type of Health Care Center and Region, 2004                             | <b>42</b>   |
| <b>Table 7:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Separation and type of Separation, Region and Type of Health Care Center, 2004 | <b>42</b>   |
| <b>Table 8:</b> Percentage of Health Care Center in the Palestinian Territory by Type of Separated Waste, Region and Type of Health Care Center, 2004  | <b>43</b>   |
| <b>Table 9:</b> Estimated Monthly Quantity of Separated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004                                | <b>44</b>   |
| <b>Table 10:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where General Waste Put in, Region and Type of Health Care Center, 2004                      | <b>44</b>   |
| <b>Table 11:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Infectious Waste Put in, Region and Type of Health Care Center, 2004                   | <b>45</b>   |
| <b>Table 12:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Sharp Waste Put in, Region and Type of Health Care Center, 2004                        | <b>45</b>   |
| <b>Table 13:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Means Where Non Separated Solid Waste Put in, Region, and Type of Health Care Center, 2004         | <b>46</b>   |

| <b>Table</b>  | <b>Page</b> |
|---|-------------|
| <b>Table 14:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of General waste, Infectious waste and Sharp waste, Region and Type of Health Care Center, 2004     | <b>47</b>   |
| <b>Table 15:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Transportation Method of Non Separated Waste, Region and Type of Health Care Center, 2004                                 | <b>48</b>   |
| <b>Table 16:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of General waste, Infectious waste and Sharp waste Collection, Region and Type of Health Care Center, 2004 | <b>49</b>   |
| <b>Table 17:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Weekly Periodicity of Non-Separated Solid Waste Collection, Region and Type of Health Care Center, 2004                       | <b>50</b>   |
| <b>Table 18:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Waste Treatment, Type of Treatment, Region and Type of Health Care Center, 2004                                  | <b>51</b>   |
| <b>Table 19:</b> Estimated Monthly Quantity of Treated Health Care Waste Produced from in the Palestinian Territory by Region and Type of Health Care Center, 2004  | <b>52</b>   |
| <b>Table 20:</b> Percent Distribution of Health Care Center in the Palestinian Territory by Existence of Solid Waste Treatment, Doer of Treatment, Region and Type of Health Care Center, 2004                            | <b>52</b>   |
| <b>Table 21:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Mean inside the Health Care Center, Region and Type of Health Care Center, 2004                    | <b>53</b>   |
| <b>Table 22:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Material Construction, Region and Type of Health Care Center, 2004  | <b>54</b>   |
| <b>Table 23:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Container Volume, Region and Type of Health Care Center, 2004   | <b>54</b>   |
| <b>Table 24:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Solid Waste Collection Place, Region and Type of Health Care Center, 2004   | <b>55</b>   |
| <b>Table 25:</b> Percent Distribution of Health Care Center in the Palestinian Territory by, Distance Between Health Care Center and Waste Collection Place (m), Region and Type of Health Care Center, 2004              | <b>55</b>   |
| <b>Table 26:</b> Percent Distribution of Health Care Center in the Palestinian Territory by the Doer of Transporting Solid Waste, Region and Type of Health Care Center, 2004   | <b>56</b>   |

| <b>Table</b>     |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Table 27:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Waste Final Disposal Place, Region and Type of Health Care Center, 2004  | <b>56</b>   |
| <b>Table 28:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by the Weekly Periodicity of Final Disposal of Waste, Region and Type of Health Care Center, 2004                           | <b>57</b>   |
| <b>Table 29:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Consumed Water Quantity in the Health Care Center, Region and Type of Health Care Center, 2004 | <b>57</b>   |
| <b>Table 30:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Wastewater Treatment in Health Care Center, Region and Type of Health Care Center, 2004        | <b>58</b>   |
| <b>Table 31:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Separation in Health Care Center, Region and Type of Health Care Center, 2004      | <b>58</b>   |
| <b>Table 32:</b> | Percent Distribution of Health Care Center in the Palestinian Territory by Effect of Intifada on the Solid Waste Treatment in Health Care Center, Region and Type of Health Care Center, 2004       | <b>59</b>   |



## List of Figures

| <b>Figure</b>    |   | <b>Page</b> |
|------------------|---|-------------|
| <b>Figure 1:</b> | Estimated Monthly Quantity of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004                     | [23]        |
| <b>Figure 2:</b> | Percent Distribution of Health Care Center by the Method of Wastewater Disposal and Type of Center, 2004                            | [24]        |
| <b>Figure 3:</b> | Estimated Monthly Quantity of Health Care Waste Produced from Health Care Center by Type of Center, 2004                            | [24]        |
| <b>Figure 4:</b> | Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004   | [25]        |
| <b>Figure 5:</b> | Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004 | [26]        |
| <b>Figure 6:</b> | Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004             | [26]        |





## **Executive Summary**

The estimated monthly quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in health care centers in Gaza Strip.

The result show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

The result show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and the percentage of the secondary health care centers that do not treat wastewater is 93.2%.

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 381 tons and 5.8 thousands cubic meter including 275 tons and 1.9 thousands cubic meter in the West Bank and 106 tons and 3.9 thousands cubic meter in Gaza Strip. 49.0% of the health care centers in the Palestinian Territory perform separation of health care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components.

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

## Chapter One

### **Introduction**

Environmental statistics in the health care centers is very interested and this statistics is an important instrument to make decisions, planning, and draw the outlines for environment. And relating to infrequency of data about this subject in the Palestinian Territory, the Palestinian Central Bureau of Statistics (PCBS) building up and develop a database about environmental in the health care centers.

The sources of the data in this report are Health Care Environment Survey 2004 (for the data about governmental and non-governmental organizations sectors), and Economical Environmental Survey 2004 (for the data about private sector).

#### **1.1 Objectives of the Report**

The main objective of this report is to make overview about the main indicators of environment in the health care centers in three sectors (governmental, non-governmental organizations and private sector), which including:

- Water consume.
- management of wastewater.
- management of health Care waste.
- Problems faced Health care centers During Intifada.

#### **1.2 Report Structure**

This report consists of five chapters: the first chapter presents introduction, the report objectives and the report structure, the second chapter describes the definitions and explanations, the third chapter briefly describes the main findings, while the fourth chapter presents the methodology used in the survey, consisting the questionnaire design, sampling design, fieldwork operations and data processing, the last chapter includes an assessment of data quality and technical notes



## Chapter Two

### Concepts and Definitions

|   |  |
|---|--|
| <b>Biological Treatment:</b>                        | Wastewater treatment employing aerobic and anaerobic microorganisms that results in decanted effluents and Separate sludge Containing microbial mass together with pollutants. Biological treatment processes are also used in combination or in conjunction with mechanical and advanced unit operations. |
| <b>Cesspit:</b>                                     | A well or a pit in which night soil and other refuse is stored, constructed with either tight or porous walls.   |
| <b>Chemical Disinfection:</b>                       | Chemicals used for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Chemical Treatment:</b>                          | Treatment methods that are used to effect the complete breakdown of hazardous Waste in to non-toxic gases or, more frequently, to modify the chemical properties of the Waste, for example, through reduction of water solubility or neutralization of acidity or alkalinity.                              |
| <b>Chemical Waste:</b>                              | May be hazardous – toxic, corrosive, flammable, reactive or genotoxic (capable of altering genetic material), or non-hazardous.  |
| <b>Clinical Waste (Health Care Waste):</b>          | Any waste coming out of health Care provided in hospitals or other health care centers. However the definition does not include health Care waste resulting from health care at home.  |
| <b>Disinfection:</b>                                | Effective killing by chemical and physical processes of all organisms capable of causing infectious diseases.  |
| <b>Dumping Site:</b>                                | Site used to dispose of solid wastes without environmental control.  |
| <b>General waste:</b>                               | All non hazardous waste, similar in nature to domestic waste   |
| <b>Hospital waste:</b>                              | Waste coming out of hospitals. Such waste is around 85 % non-hazardous, around 10 % are infectious, around 5% non-infectious but hazardous.  |
| <b>Incineration (Dry Thermal Disinfection):</b>     | Controlled burning of solid, liquid or gaseous waste materials at high temperatures.   |
| <b>Infectious Waste:</b>                            | All kinds of waste, which may transmit viral, bacterial or parasitic diseases to human beings. It includes infectious animal waste from laboratories, slaughter- houses, veterinary practices and so on.   |
| <b>Irradiation:</b>                                 | Use of radiation (X rays, or gamma rays) for effective killing of all organisms capable of causing infectious diseases.  |
| <b>Mechanical Treatment (of Health Care waste):</b> | Crush, break, cut or otherwise damage of sharps prior to treatment.  |

|  |  |
|--|--|
| <b>Mechanical Treatment (of Wastewater):</b> | Wastewater treatment of physical and mechanical nature that results in decanted effluents and Separate Sludge. Mechanical treatment processes are also used in combination with biological and advanced unit operations. Mechanical treatment includes Processes such as sedimentation and flotation.                        |
| <b>Open burning:</b>                         | Out door burning of wastes such as lumber, scrapped cars, textiles, sawdust and so forth.  |
| <b>Pharmaceutical Waste:</b>                 | This includes pharmaceutical products, drugs and chemicals, which have been returned from wards, have been spilled or soiled, are out of date or contaminated, or are to be discarded for any reason.  |
| <b>Primary Health Care Center:</b>           | Health center offers preventive care (diagnostic and curative) before illness case is complicated.   |
| <b>Radioactive Waste:</b>                    | Material that contains or is contaminated with radionuclides at concentrations greater than those established as “exempt” by the competent authorities. To avoid persistent harmful effects, long-term storage is necessary, for which purpose so-called “isotope cemeteries” and abandoned quarries are used.               |
| <b>Secondary Health Care Center:</b>         | Health center offers curative and nursing health care for illness case exceeding Primary Health Care.  |
| <b>Separation (Segregation):</b>             | The system separation of solid waste into designated categories  |
| <b>Sewage Network:</b>                       | System of collectors, pipelines, conduits and pumps to evacuate wastewater (rainwater, domestic and other wastewater) from any of the location paces generation either to municipal sewage treatment plant or to a location place where wastewater is discharged.  |
| <b>Sharps:</b>                               | Any item that could cause a cut or puncture (especially needles and blades).   |
| <b>Solid Waste Disposal:</b>                 | Ultimate deposition or placement of refuse that is not salvaged or recycled.   |
| <b>Solid Waste:</b>                          | Useless and sometimes hazardous material with low liquid content, solid wastes include municipal garbage, industrial and commercial waste, sewage sludge, wastes resulting from agricultural and animal husbandry operations and other connected activities, demolition wastes and mining residues                           |
| <b>Storage (of the Health Care Waste):</b>   | The containment of health care waste in manner that dose not constitute disposal of the health care waste.   |
| <b>Transport of the Health Care Waste:</b>   | The movement of the health care waste from the point of generation to any intermediate point and finally to the point of treatment or disposal. Transport does not include the movement of health care waste from a health facility or agency to another health facility or agency for the purposes of testing and research. |

**Treatment of the Health Care Waste:** Processes that modify the waste in some way before it is taken to its final resting place.

**Waste Collection:** Collection or transport of waste to the place of treatment or discharge by municipal services or similar institutions, or by public or governmental and non-governmental corporations, specialized enterprises or general government. Collection of municipal waste may be selective, that's to say carried out for a specific type of product, or undifferentiated, in other words, covering all kinds of waste at the same time.

**Wastewater Treatment:** Process to render wastewater fit to meet environmental standards or other quality norms. Three broad types of treatment may be distinguished: mechanical, biological, and advanced.

**Wastewater:** Used water, typically discharged into the sewage system. It contains matter and bacteria in solution or suspension.

**Wet Thermal Disinfections:** Autoclaving at 160 Co under high pressure to effective killing of all organisms capable of causing infectious diseases.

**Symbols Used in Tables:**

(-) Not available

(0) less than half of the unit



## Main Findings

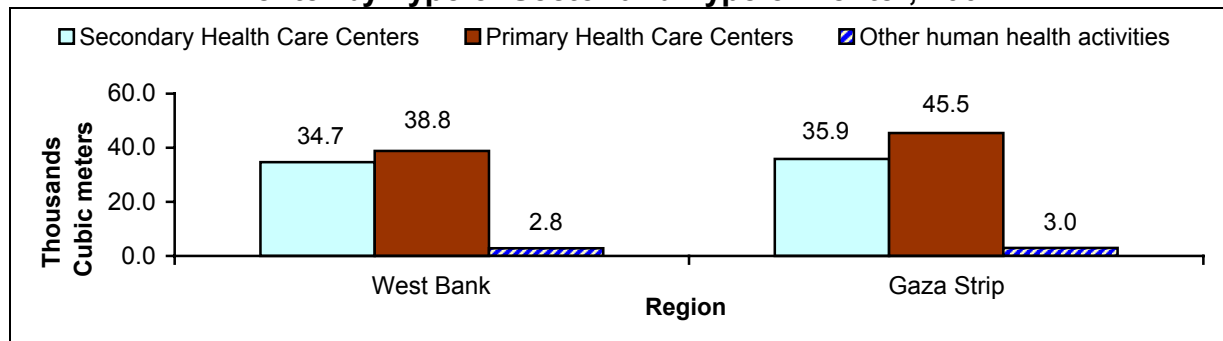
This section presents the main findings of the Care Environment Survey 2004 and data for private health care sector which come from Economical Environmental Survey 2004. Statistical results are classified according to the main components of environmental elements in the governmental and non-governmental health care centers, including water, health care waste, and wastewater.

### 3.1 Water:

#### Consumption:

The estimated quantity of water consumed by the health care centers in the Palestinian Territory was 160.7 thousands cubic meter/month, of which 76.3 thousands cubic meter/month in West Bank, and 84.4 thousands cubic meter/month in Gaza Strip.

**Figure 1: Estimated Monthly Quantities of Water Consumed from Health Care Center by Type of Sector and Type of Center, 2004**



#### Sources of Water Supply:

The results show that 93.2% of the health care centers in the Palestinian Territory get the water for consumption from water network, where 95.6% of the secondary health care centers, and 92.6% of the primary health care centers get the water from the same source.

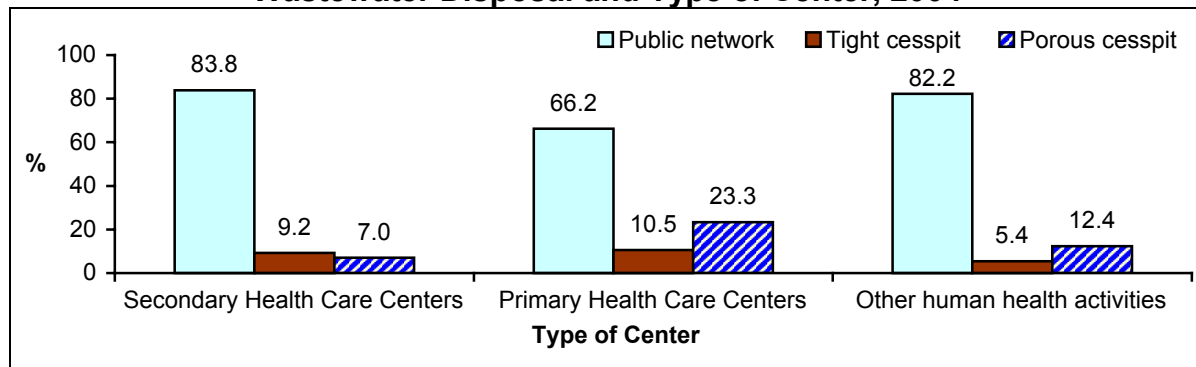
### 3.2 Wastewater:

#### Disposal Methods:

The results show that 68.7% of the health care centers in the Palestinian Territory dispose their wastewater using public network, and 9.9% of the health care centers use tight cesspit. Also 21.4% of the health care centers use porous cesspit.



**Figure 2: Percent Distribution of Health Care Centers by the Method of Wastewater Disposal and Type of Center, 2004**



**Treatment of Wastewater:**

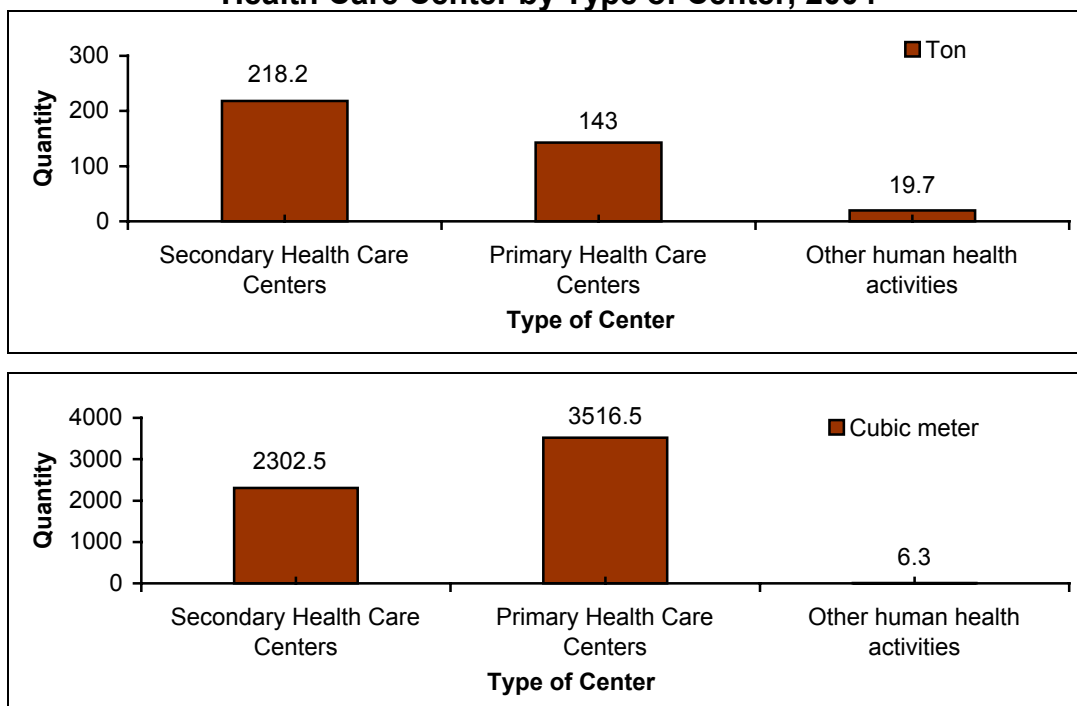
The percentage of the secondary health care centers that do not treat wastewater is 93.2%, 99.3% of primary the health care centers and 99.2% of other human health activities. The main treatment methods used are the mechanical, the chemical treatments and biological treatment.

**3.3 Health Care Solid Waste:**

**Quantity:**

The monthly estimated quantities produced by the health care centers in the Palestinian Territory were about 380.9 tons and 5.8 thousands cubic meter including 274.8 tons and 1.9 thousands cubic meter in the West Bank and 106.1 tons and 3.9 thousands cubic meter in Gaza Strip. While the total estimated quantities produced by the secondary health care centers in the Palestinian Territory were about 218.2 tons and 2.3 thousands cubic meter.

**Figure 3: Estimated Monthly\* Quantities of Health Care Waste Produced from Health Care Center by Type of Center, 2004**



\* The quantities estimated by using two units, cubic meter and ton

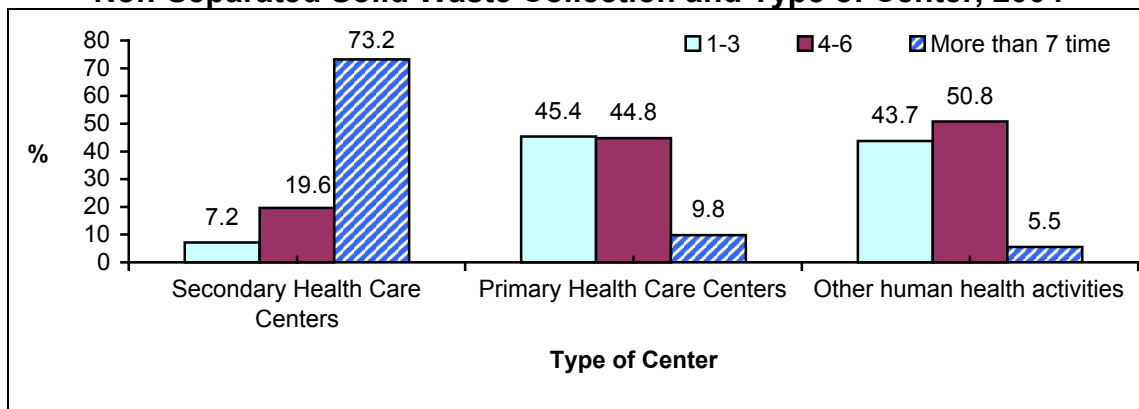
### Separation:

49.0% of the health care centers in the Palestinian Territory perform separation of health Care waste components, as 70.6% of the health care centers separate some components while 29.4% of the health care centers separate all the components. However, the percentage of the health care centers that perform separation is 58.4% separate General waste, whereas 55.4% of the health care centers separate Infectious waste. The quantities of separated waste in the health care centers were estimated at 145.2 tons and 83.3 cubic meter.

In the Centers that perform waste separation and package the separated waste, the packaging depends on the type of the separated waste. Nylon bags are used for packaging the General waste in 54.7% of the health care centers in the Palestinian Territory, while Plastic boxes are used for packaging the Infectious waste in 37.3% of the health care centers. 76.5% of the health care centers used nylon bags to packaging the non-separated waste.

The periodicity of collecting health care waste is from 4 to 6 times per week in 59.0% of the health care centers. The non-separated waste in the health care centers was collected from 4 to 6 times per week in 44.9% of the health care centers.

**Figure 4: Percent Distribution of Health Care Center by Weekly Periodicity of Non-Separated Solid Waste Collection and Type of Center, 2004**



### Transportation:

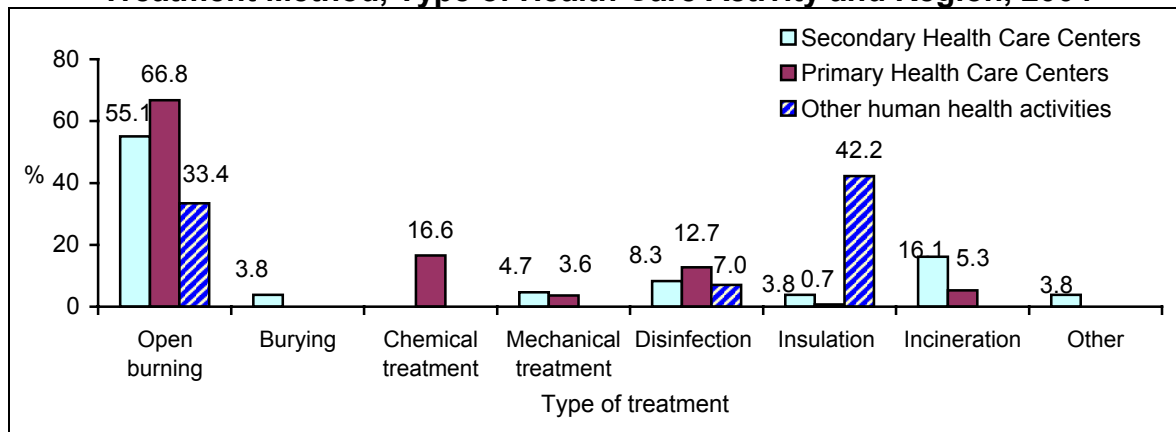
The transportation in the health care centers in the Palestinian Territory that perform separation of General waste is done manually in 96.7% of the health care centers, and 1.9% of the health care centers use special carriages, in otherwise is done manually for Infectious waste in 97.0%, and 1.1% of the health care centers use special carriages. While in the Centers that do not perform separation of waste, the waste was transported manually in 96.3% of the health care centers and using special carriages in 2.2% of the health care centers.

### Treatment:

The percentage of the health care centers in the Palestinian Territory that do perform treatment of health Care waste is about 16.0%, of which 26.2% in secondary health care centers, 16.9% in primary health care centers and 7.7% in the other human health activities.

The most important treatment method is the open burning in 64.2% of the health care centers, and 14.7% of them use chemical treatment, and 8.3% used disinfection. The quantities of treated waste were about 62.9 ton and 159.8 cubic meter in the health care centers in the Palestinian Territory.

**Figure 5: Percent Distribution of Health Care Center by the Health Care Waste Treatment Method, Type of Health Care Activity and Region, 2004**



**Disposal:**

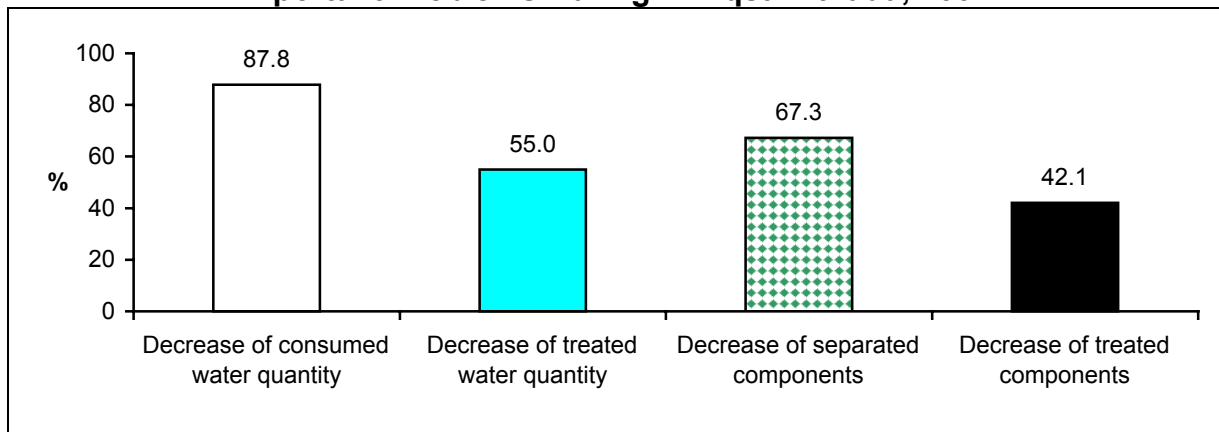
In this stage, the waste is compiled in a place then transferred to a place of final disposal. 61.7% of the health care centers compile waste in a local authority open container, 9.7% of the health care centers in containers local authority closed container, and 5.6% of the health care centers in health care center open container, while 3.9% of the health care centers in health care center closed container and 19.1% of the health care center don't use a container, and 86.0% of used containers made from metal.

The local authority transfers the waste to a place of final disposal in 83.1% of the health care centers. The place of final disposal was a dumping site owned by the local authority for 84.7% of the health care centers in the Palestinian Territory. The periodicity of waste final disposal was 4 to 6 times per week for 53.7% of the health care centers.

**3.4 Problems faced Health care centers During Intifada:**

Health care centers faced many problems due to Israeli destruction of the infrastructure of the Palestinian community during Al-Aqsa intifada, the most important problem was the decrease of consumed water quantity which considered as a problem for 87.8% of the health care centers.

**Figure 6: Percent of Health Care Center in the Palestinian Territory by the Most Important Problems During Al-Aqsa Intifada, 2004**



## Methodology

### 4.1 The Survey Questionnaire:

The environmental questionnaire was designed in accordance with the similar country experiments and according to international standards and recommendations for the most important indicators, taking into account the special situation of Palestinian Territory.

### Test the Questionnaire:

To test the questionnaire we take the results of the last surveys that implemented by the PCBS in 2000, 2001 as a pretest; consequently some modifications were made on the questionnaire and on the instructions.

### 4.2 Sampling and Sampling Frame:

#### Target Population:

The target population of this survey is all health care centers in the Palestinian Territory, and they divide to:

1. Governmental health care centers (Ministry of Health, Health Care Military Service, Lijan Azakah).
2. Non-governmental health care centers (Health Union Committees, Union of Palestine Health Care Relief Committees, Refits Friends Benevolent Society, UNRWA, Red Crescent Society, and Red Cross) in the Palestinian Territory.
3. Private health care sector.

#### Sampling Frame:

The sampling frame was based on by type of health care centers:

1. **Private Health Care Sector:** The general frame for the establishments which finding of the 1997 Center Census conducted by PCBS, which was updated annually by the updating frame survey 2002.
2. **Governmental and Non-governmental Health care centers:** The frame of the all centers which work in sector of health care which owned by Governmental and Non-governmental health care centers updated annually by thru the administration records in the PCBS.

#### Sample size:

This section is only for the privet sector data, which implemented by using a sample, and the sample size was 285 privet health care center in the Palestinian Territory. It was distributed according to the economic activities into 44 centers of hospital activities, 165 centers of medical and dental practice activities, 76 centers of other human health activities.

#### Sample Design:

The sample of Economical Environmental Survey 2004 is a single-stage stratified cluster random sample.

### **4.3 Field Work:**

The Field Work is the real work to get the demanded data from the primary source, and guarantee a good orthopedist for this stage is the main affair which works on in this stage.

The data in this report come from two sources and each one have a method to collect data about the health care centers.

The data which come from Health Care Environment Survey 2004 collecting by the administrative record team, where they apportion the questionnaires to the respondents to filed by them himself.

And about the data which come from Economical Environmental Survey 2004 collecting by field workers, and this type of collection method must be pass on tow stage:

1. Training Fieldworkers on the main skills before the start of data collection.
2. Distribution the team of Fieldworkers to groups.

### **4.4 Data Processing:**

The data processing stage consisted of the following operations:

#### **Editing before data entry:**

All questionnaires were edited again in the office using the same instructions adopted for editing in the fields.

#### **Data entry:**

In this stage data were entered into the computer, using Microsoft Access. The data entry program was prepared to satisfy a number of requirements such as:

- Duplication of the questionnaire on the computer screen.
- Logical and consistency check of data entered.
- Possibility for internal editing of questions answers.
- Maintaining a minimum of digital data entry and fieldwork errors.
- User-Friendly handling.
- Possibility of transferring data into another format to be used and analyzed using other statistical analytical systems such as SAS and SPSS.

## Chapter Five

### Data Quality

Two types of errors affect the quality of survey data; statistical and non-statistical errors.

#### 5.1 Statistical Errors

This type of errors could be determined easily, and it is result from sampling errors, and this type of errors concern the data of private health care centers. And to reduce this errors the data mast pass tow stage:

##### Estimations Procedure

It is necessary, when calculating the estimations of the survey indicators, to calculate the weights of the establishments. The weight of an establishment is the mathematical inverse of choosing it.

##### Calculation of Variances

Variance is change from a variable to another, it depends on:

1. The sample size
2. The actual variance for all the population units
3. the sample design

The variance for a number of variables was calculated using CENVAR

#### 5.2 Non-Statistical Errors

This type of errors result from non-sampling errors, and could not be determined easily due to the diversity of sources (e.g. the interviewers, respondent, editor, data entry operator... etc).

However, several measures were adopted to minimize the effects of these errors. The interviewers, editors and coders had undergone intensive training and were provided with fieldwork manuals to consult when facing any problem.

The data entry program was designed in a way that allows error detection and correction. This applies particularly to logical errors that might not be discovered before data entry operations. A consistency check was also performed to assure accuracy after data entry.



## References

1. Palestinian Central Bureau of Statistics, 1996. *Stander industrial Classification of all Economic Activities for West Bank and Gaza Strip (PISIC)*. Ramallah- Palestine.
2. Palestinian Central Bureau of Statistics, 2000. *Medical Environmental Survey 2000, Main Finding*. Ramallah- Palestine.
3. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers in Private Sector 2001, Main Finding*. Ramallah- Palestine.
4. Palestinian Central Bureau of Statistics, 2002. *Environmental Survey for Health Care Centers 2001, Main Finding*. Ramallah- Palestine.
5. Palestinian Central Bureau of Statistics, 2003. *Environmental Survey for Health Care Centers 2003, Main Finding*. Ramallah- Palestine.
6. Palestinian Central Bureau of Statistics, 2003. *Environmental Economic Survey-2003: Main Findings*: Ramallah- Palestine.
7. Palestinian Central Bureau of Statistics, 2004. *Environmental Economic Survey-2004: Main Findings*: Ramallah- Palestine.
8. World Health Organization, 1994. *Managing Health Care Waste in Developing Countries*, Geneva - Switzerland.
9. World Health Organization, 1999. *Safe management of waste form health-care activities*, Dr Adrian Coad.
10. United Nations, 1997. *Glossary of Environment Statistics. Series F, NO.67*. New York- USA.