PN-ACW-509

ANNUAL REPORT NO.1

NOVEMBER 15, 2002 – NOVEMBER 15, 2003

Submitted to the U.S. Agency for International Development

Bureau for Global Programs

Field Support and Research

Center for Economic Growth and Agricultural Development

TITLE OF PROJECT: **ASSESSMENT OF NEW STRATEGIES FOR SCREENING OF BLOOD FOR HCV**

Principal Investigator:

PROF. BATIA SAROV, PhD, MPH

Ben-Gurion University of the Negev (BGU)

Co-Principals:

PROF. J. SAFI, PhD - PI

Environmental Protection & Research Institute (EPRI)

PROF. E. SHINAR, MD

Blood Services Center, Magen David Adom (MDA) in Israel

PROF. E. LITVAK, PhD

Boston University (BU)

Project Number: M23-017

Award Number: TA-MOU-02

January 15, 2004

PROJECT

ASSESSMENT OF NEW STRATEGIES FOR SCREENING OF BLOOD FOR HCV

Submitting Institution: Ben-Gurion University of the Negev (BGU)

Epidemiology Department,

Faculty of Health Sciences

P.O. Box 653

Beer-Sheva 84105, Israel

INSTITUTIONS AND RESEARCHERS

Israeli team

B. SAROV, PhD, MPH
Professor of Epidemiology – P.I., BGU

JS PLISKIN, PhD
Professor of Health Systems Management and Industrial Engineering , BGU

N. GALAI PhD - biostatistician, BGU

A. YAARI, PhD, MSc – senior lab technician, BGU

M. ORGEL, PhD, MD – senior lab technician, BGU

E. SHINAR, MD
Director Blood Services Center - MDA

V. YAHALOM, MD – Assistant Director Blood Services Center– MDA

E. BEN-PORAT, PhD – senior consultant – MDA

B. COHEN - senior lab technician - MDA

L. MICHAELOVICI – senior lab technician – MDA

L. SHVARTZ– senior lab technician - MDA

L. NOVACK, PhD candidate and co-investigator –BGU

N. BEER, MPH student - study Coordinator - BGU

Palestinian team

J. SAFI, PhD
Chairman of the Environmental Protection &Research Institute –P.I, EPRI

A. EL-ALEM, MD - EPRI

Y. EL-NAHHAL, PhD, study coordinator – EPRI

H.D. SOLIMAN, PhD– senior med. Technologist-EPRI

MJ SAFI – lab technician - EPRI

American team

E. LITVAK, PhD – Prof. Of Health Care and Operations Management -BU

K. KACENA, PhD – co-investigator -BU

Section I. TECHNICAL PROGRESS

I. A) Research Objectives

The main objective of the study is to improve the accuracy of screening blood donations for HCV.

The objectives for the first year:

1. To train lab technicians to work with the HCV-Ag ELISA screening test and confirmatory Assay (Ortho Clinical Diagnostics, USA (OCD)).
2. To obtain all the necessary equipment and supplies needed to conduct the study experiments in the three study sites.
3. To plan the different stages of the project, and design proper protocols for each stage, for the laboratories of the 3 sites.
4. To perform the preliminary experiments.
5. To perform the proficiency panel testing.
6. To start testing seroconversion panels.

I. B) Research Accomplishments

During the reported period , we have accomplished the following items of the work plan:

(1) Trained lab technicians from all 3 participating sites to perform both the HCV-Ag screening and confirmatory assays (see section II.C) .

(2) Obtained the necessary equipment and materials required to perform the assays, including 3 positive samples to be used in the proficiency panel, and 7 of the seroconversion panels.

(3) Planned the different stages of the study (as specified below).

(4) Developed protocols for the preliminary experiments, the proficiency testing and the seroconversion panels (as specified on pages 6-12).

(5) Conducted a series of preliminary experiments to determine the desired pool size of HCV Ag testing.

below is a brief description of the activities completed in each study site:

BGU – planned the experiments; trained EPRI lab technicians; lab technicians were trained at MDA.

MDA - planned the experiments; were trained by DOVER company; trained BGU and EPRI staff; collected all HCV-Ab negative sera needed for pooling, and tested them for HCV-Ag;

Preformed the preliminary experiments.

EPRI - planned the experiments; were trained in BGU, MDA and Belgium; collected HCV-Ab negative sera from routine blood donations in Gaza for pooling; obtained most of the equipment needed for EPRI lab site.

BU – Reviewed of the plans for the study experiments.

Outline of the study plan:

This study will be done in the following stages:

1. Preliminary experiment on HCV-Ag "old" positive samples, which has been completed.
2. Proficiency panel.
3. Seroconversion panels.
4. Testing pools from negative donors with implanted positive samples.

Detailed description and purpose of each stage:

1. The preliminary experiments included pooling with known HCV-Ag positive samples. These samples were pooled in pool sizes of 3, 6 and 12, and tested for HCV with the HCV-Ag assay. These experiments have provide us with a first indication on whether the HCV-Ag assay is capable of detecting positive signals in pools, and the maximal pool size that can be used in the forthcoming experiments. This stage was done in MDA.

The protocol of the preliminary experiments is described in pages 6-7.

After analyzing the results, we have concluded that the study should continue as planed. Please see the summary of the results and discussion on pages 13-19.

2. Proficiency panel – This stage will serve as a quality control, ensuring that all study sites perform the assay and the pooling with similar proficiency. The panel will be prepared at BGU, and will be pooled manually and tested at BGU, MDA and EPRI. We will conduct this stage after all the study sites receive all the necessary equipment for working properly with the kit.

The protocol of the proficiency panel is described on page 8-9.

3.The experiments on seroconversion panels – Details of PCR results and the HCV antibody status of each bleed is available, as well as the date on which it was obtained. This will allow us to estimate the time till detection of HCV-Ag during the window period, and compare this to the time of detection of the other markers of infection by ELISA (HCV antibody), and PCR (HCV-RNA). There will also be a comparison of time till detection between HCV-Ag tested on singleton and on pooled samples.

We will conduct this stage as soon as the proficiency panel stage will be successfully completed.

Eighteen seroconversion panels will be tested in singletons and pools with the HCV-Ag assay including the confirmatory tests, twelve at BGU and six at EPRI.

Pooling at this stage will be done manually.

Pools containing a seronconversion panel bleed which is PCR positive for HCV in singleton testing, will be transferred to MDA and tested for HCV-RNA by PCR.

The protocol of the seroconverssion panels experiments is described on pages 10-12.

4. Testing pools from negative donors from routine work – The HCV negative donor samples will be pooled with implanted positive samples, and tested with the HCV-Ag assay including the confirmatory tests.

The maximal pool size used during this stage will be determined after reviewing the results of the seroconversion panel experiments.

If the maximal pool size will remain 12, the pooling in MDA will be done with the automated sampler. If the maximal pool size will be 6 or below, the pooling will be done manually.

In EPRI laboratory the pooling will be done manually on all pool sizes.

The protocol of the preliminary experiments:

Preliminary experiments using ELISA testing for HCV-Ag on pool sizes of 3-6-12: Standards of procedures for work at MDA

Goal:

To get a preliminary indication on which pool sizes are possible for detection by the HCV-Ag assay (OCD). After reviewing the results of this stage, the researchers will decide whether to proceed with the existing objectives and protocols of the study.

Materials:

- 15 samples that are HCV-Ag positive and HCV-Ab negative. These samples originated from commercial plasma suppliers in the USA. They are "left overs" from experiments done at MDA 2 years ago, when they were provided by OCD, and have been kept frozen at -30^{0}C since. According to the original OD readings of the HCV-Ag tests performed in singletons, Five of these samples are considered "strong" positives (OD above 1.5), 5 are considered "intermediate" (OD between 0.5 and 1.5), and 5 are considered as "weak" positives (OD between the cutoff point and 0.5).
- 66 samples negative for anti-HCV and HCV-Ag, obtained from the routine work of MDA during May-July 2003.

Methods:

Pooling:

1. At this stage 5 "strong" positive samples will be pooled with 22 HCV-Ag negative samples in pool sizes of 12, 6 and 3. 3 positive samples will be pooled with a set of 11 negatives, and the other 2 positive samples will be pooled with a set of 11 different negatives. Assigning the positive samples to the negatives which will pool them, will be done at random.

2. The next 10 positive samples will be pooled. Pool sizes will be determined after examining the results from the first stage. If there is a positive result on pools of size 12 in any of the first 5 poolings, then the other 10 poolings will be done on pool sizes of 12, 6 and 3. If none of the first 5 pools give positive results in pools of 12, then the next 10 poolings will be done on pool sizes of 6 and 3.

For this stage of pooling there will be 4 sets of 11 negative samples which will be used for pooling.

3. Pools with only the negative samples, which were used for the pooling of positive samples, will be tested as to assure that the positive reading was due to the insertion of the positive sample.

The pooling process:

Negative samples will be taken from routine work at MDA. The samples will be negative for HCV-Ab , and will be tested for HCV-Ag in singleton to assure that they are HCV-Ag negative.

Each pool of 12 will include sera from the 11 negative samples and from one positive sample. If a sufficient amount of serum remains from the positive sample, we will make pools of 6. Each pool of 6 will include sera from 5 of the negative samples and from one positive sample. If there is still enough serum from the positive sample, we will also make pools of 3. Each pool of 3 will include sera from 2 negative samples and from one positive sample. The volume of each singleton sample and pool size will be 100μl, which is the volume required for the HCV-Ag assay.

Testing:

HCV-Ag assay testing will be performed in each pool size formed.

Results' documentation:

The results of the singleton HCV-Ag assay and PCR results for the HCV-Ag positive samples will be obtained from the previous testing performed at MDA.

The results of the preliminary experiments will be presented in the following table:

Preliminary experiments with HCV-Ag: HCV-Ag (ORTHO) pooled testing compared to HCV-Ag (ORTHO) and PCR in singleton

	sample	PCR in singleton	HCV-Ag S/CO in singleton	HCV-Ag, S/CO		
				in pools of 3	in pools of 6	in pools of 12
strong	**1**					
	2					
	3					
	4					
	5					
intermediate	**6**					
	7					
	8					
	9					
	10					
weak	**11**					
	12					
	13					
	14					
	15					

Proficiency panels: Standards of procedures

Goal:

To demonstrate that all three study site laboratories (MDA, BGU, and EPRI) perform the HCV-Ag assays and manual pooling with similar proficiency.

Materials:

- Three samples that are HCV-Ag positive and HCV-Ab negative.
- 36 samples negative to anti-HCV and HCV-Ag, obtained from the routine work of MDA, distributed in 72 eppendorf tubes (each sample split into 2 tubes).

Panel Description:

Each of the 72 Eppendorf tubes should have a volume of 700μl serum in each, numbered 1-72.

The panel will be arranged in such a way that 3 pools of 12 should be positive and 3 pools of 12 should be negative. Each negative set of 12 negative samples will be used for pooling one positive and one negative pool.

Note: These panels will be assembled by Dr. Arieh Yaari. All persons testing the proficiency panel will be blinded.

Shipping and storage conditions

The panels will be kept at -70^0C and shipped on dry ice to each of the other two study sites.

Testing the Proficiency Panel

1) Pool all 6 pools of 12.
2) Pool all 12 pools of 6.
3) Pool 8 pools of 3. As assigned by Arieh who has prepared the panel (5 of these pools will be negative, and 3 will be positive).
4) Test these pools for HCV-Ag.
5) Test the 9 individual samples belonging to the positive pools of 3.
6) Confirm the positive samples with the confirmatory test.
7) Report all results.

Directions for manual pooling in pool sizes of 12, 6, 3

1) For pools of 12: Pool 12 Eppendorfs by adding 10μl of each to an empty Eppendorf (total of 120μl)
2) For pools of 6: Pool 6 Eppendorfs by adding 20μl of each to an empty Eppendorf (total of 120μl)
3) For pools of 3: Pool 3 Eppendorfs by adding 40μl of each to an empty Eppendorf (total of 120μl)

Note: After pooling, vortex each pool for 5 seconds.

Data Analysis: Compare all results, checking for the concordance of results within each lab and between labs.

Seroconversion panels: standards of procedures

Goal:

1) To measure the sensitivity and specificity of pooling procedures for HCV-Ag for pool sizes 3, 6 and 12 by HCV-Ag assay (OCD) compared to singleton testing for HCV-Ag.
2) To measure the sensitivity and specificity of pooling procedures for HCV-Ag for pool sizes 3, 6 and 12 by HCV-Ag assay (OCD) compared to testing by PCR in pools.

Materials:

- seroconversion panels for HCV (purchased from Impath-Bio Clinical Partners, BBI and Nabi Diagnostics companies)
- samples negative to anti-HCV and HCV-Ag, obtained from the routine work of MDA

Methods

Pooling:

Every bleed from each panel will be pooled in pools of sizes 3, 6 and 12 with samples negative to both anti-HCV and HCV-Ag.

All the bleeds of one panel will be diluted by the same 11 negative samples.

The dilution process:

Label 12 samples (11 negatives and one panel bleed) by numbers 1-12, in a way that the bleed from the panel will be #1.

For pooling in pool size of 12, use all 12 samples and create 2 identical pools by pooling the same samples twice, in 2 independent test tubes (duplicate). The test tubes will be labeled "*a*" and "*b*".

For pooling in pool size of 6, create 2 identical pools as described above using samples

1-6.

For pooling in pool sizes of 3, create 2 identical pools as described above using samples 1-3.

Testing

(1) The negative samples supplied by MDA, that will be used for pooling, have already been tested for Anti-HCV, as part of the routine screening in MDA. As they should also be HCV-Ag negative, they will be tested for HCV-Ag in singleton to insure it.

(2) Tests for HCV-Ag will be performed in singleton for each panel bleed. If the initial result is positive, the test should be repeated in duplicates (according to manufacturer's recommendations).

(3) HCV-Ag confirmatory test will be done on every singleton bleed which gives a positive result in the HCV-Ag assay (defined as at least 2 of 3 positive results – according to manufacturer's recommendations).

(4) All pools will be tested for HCV-Ag once for each of the identical pools.

(5) PCR testing will be repeated on each PCR positive bleed (according to the panel's catalog). The last negative bleed previous to the first positive bleed will also be tested. If this negative bleed according to the catalog is found positive to PCR testing, PCR testing will continue until the first PCR negative sample is found. PCR testing will also be done for all pools that include a PCR positive bleed. The testing for PCR will be done on test tube "*a*" of the duplicates.

6) antibody testing will be done for each singleton and pool.

Results' documentation: We will document all the results of testing. The serological status of the samples before they enter the experiments (according to MDA blood bank testing), will also be recorded, using their computer database.

Laboratory volume calculations:

For testing of each singleton sample we will need to have the total volume of 1200 µl. Calculated as follows:

(1) HCV-Ab ---------- 100 µl

(2) HCV-Ag assay ----------* 3 (when needed)---------- 100 µl

(3) HCV-Ag confirmatory test ---------- 400 µl

(4) PCR testing ---------- 200 µl

(5) Archive ---------- 200 µl

For testing of each pool we will need to have the total volume of 600ul in each of the 2 identical test tubes. Calculated as follows:

(1) HCV-Ab---------- 100 µl

(2) HCV-Ag assay ---------- 100 µl

(3) PCR testing ---------- 200 µl

(4) Archive ---------- 200 µl

Each panel bleed will be used for singleton testing and pooling. Each panel bleed will need to have the total volume of 1900µl. Calculated as follows:

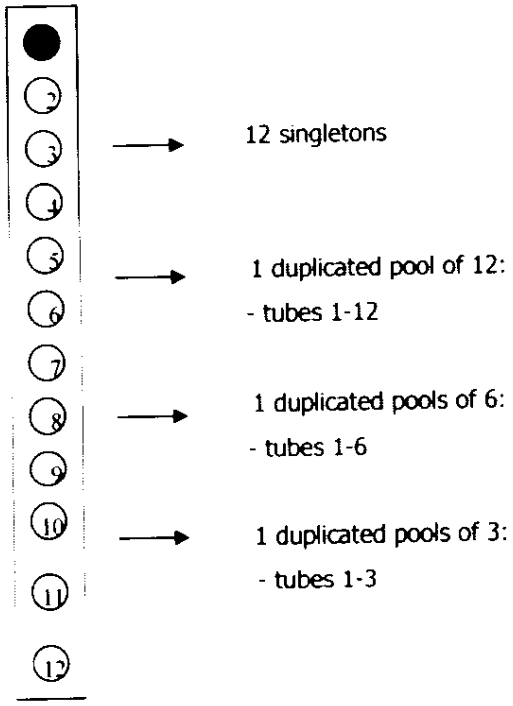
(1) for singleton testing ---------- 1200µl ---------- 1200 µl
(2) for testing in pools of 12 ---------- 600/12 --------- 50 µl --*2 ------- 100 µl
(3) for testing in pools of 6 ---------- 600/6 -------- 100 µl --*2-------- 200 µl
(4) for testing in pools of 3 ---------- 600/3 -------- 200 µl --*2-------- 400 µl

---

1900 µl

This means that each negative sample will need to be with the volume 1200 µl + 600 µl multiplied by the number of bleeds in the panel it will dilute (usually 4-7 bleeds).

One panel bleed and 11 negative samples



The preliminary stage:

All the stored specimens were re-tested. We found a great difference between the singleton results obtained 2 years ago, and those found recently. As the samples have undergone prolonged storage or multiple freeze/thaw cycles, the level of HCV Core Antigen has deteriorated since initial testing was carried out, resulting in much lower readings. Therefore, the samples were re-categorized. Some of them were re-categorized into a different group, and some were found to be negative, and were excluded from the experiments. Positive samples were added to the experiments to assure that we had at least 5 samples in each category.

The results of the preliminary stage:

The following tables include results of the PCR from the previous testing; results of singleton testing in previous and recent testing; and the results of HCV-Ag testing in pools of 3, 6 and 12 in the recent testing. As can be seen, there is a significant difference in readings of the previous and recent singleton testing, in most cases.

For each test, we show 2 values:
The absolute OD result – the absorbance value of the samples.
The S/CO – the sample to cut off value. If the S/CO value is above 1 – the sample gave a positive result, and if the value is below 1 – the sample gave a negative result.

Table 1 depicts that in pools of 3, all "strong positive" samples still gave a positive reading. In pools of 6 and 12, one of the samples gave a negative result, and the other four remained positive.

Table 2 shows that all 5 of the "intermediate positive" samples, remained positive in pools of 3 and 6, and that two of the five samples gave negative results in the pools of 12.

From table 3, we learn that of the "weak positive" samples, two gave negative results in pools of 3, five gave negative results in pools of 6, and all seven were negative in pools of 12.

Results of the preliminary experiments:

Table 1: results of "strong positive" pooling

sample number	PCR in singleton (previous testing) copies/ml	HCV Ag in singleton (previous testing)		HCV-Ag in singleton		HCV-Ag					
		OD	S/CO	OD	S/CO	in pools of 3		in pools of 6		in pools of 12	
						OD	S/CO	OD	S/CO	OD	S/CO
4	2,330,090	9.9	208	>9.859	>292.55	1.149	32.829	1.51	44.559	0.473	13.912
7	584,100	2.66	66.6	1.882	55.912	0.581	16.6	0.148	4.066	0.09	2.647
13	1,691,600	9.987	227.00	1.992	46.871	0.083	1.861	0.02	0.448	-0.002	-0.045
						0.059	1.405	0.018	0.429	0.05	1.190
11	1,060,420	9.987	226.90	2.627	61.812	0.834	18.7	0.454	10.179	0.173	3.879
80	2,052,740	9.992	227.09	>9.871	>232.26	1.674	37.534	0.988	22.152	0.658	14.753

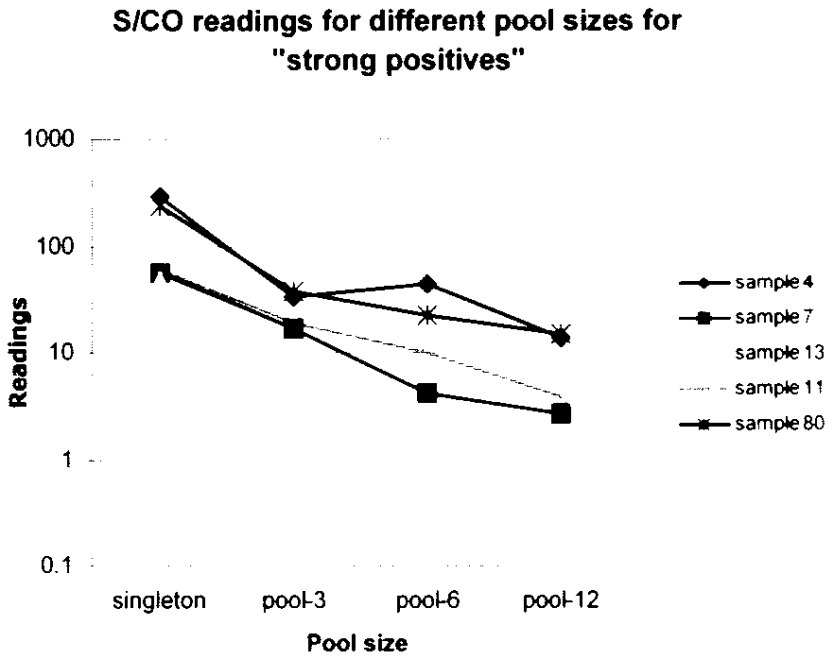
Table 2: results of "intermediate positive" pooling

sample number	HCV in singleton (previous testing) copies/ml	HCV-Ag in singleton (previous testing)		HCV-Ag in singleton		HCV-Ag					
		OD	S/CO	OD	S/CO	in pools of 3		in pools of 6		in pools of 12	
						OD	S/CO	OD	S/CO	OD	S/CO
60	1,425,000	0.9	2.08	0.918	27.273	0.288	8.229	0.18	5.294	0.048	1.412
36	844,740	1.986	45.1	0.652	19.37	0.128	3.657	0.056	1.647	0.014	0.412
6	981,080	2.06	51.5	0.969	28.788			0.086	2.363	0.089	2.618
						0.146	4.171	0.062	1. 771	0.002	0.629
								0.061	1.743	0.006	0.171
74	1,122,070	2.480	53.91	1.078	25.365	0.196	4.395	0.075	1.682	0.049	1.099
53	1,029,430	2.708	61.54	1.004	23.624	0.158	3.543	0.074	1.659	0.041	0.919

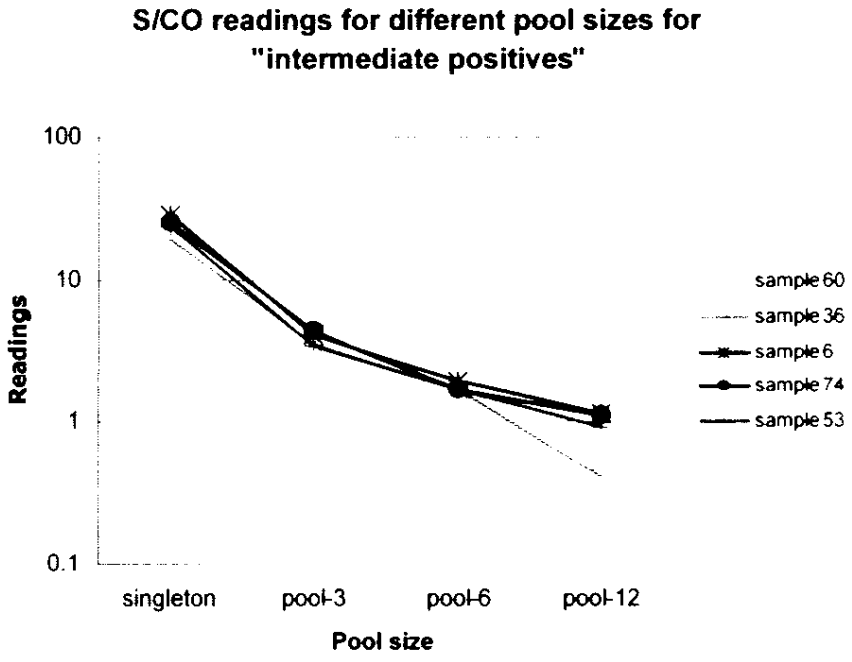
Table 3: results of "weak positive" pooling

Sample number	PCR in singleton (previous testing) copies/ml	HCV-Ag in singleton (previous testing)		HCV-Ag in singleton		HCV-Ag					
		OD	S/CO	OD	S/CO	in pools of 3		in pools of 6		in pools of 12	
						OD	S/CO	OD	S/CO	OD	S/CO
38	330,960	0.369	8.58	0.116	3.314	0.141	3.874	-0.005	-0.137		
						0.031	0.886	0.004	0.114	-0.01	-0.286
39	248,950	0.292	6.79	0.037	1.057	0.004	0.110	0	0.000		
						0.003	0.086	0.006	0.171	-0.012	-0.343
40	283,590	0.241	5.6	0.073	2.086	0.019	0.522	-0.01	-0.027		
						0.013	0.357			-0.01	-0.286
28	413,260	1.06	25.87	0.203	5.8	0.062	1.703	0.042	1.154		
										0.002	0.057
58	1,050,980	1.57	32.7	0.096	2.743	0.061	1.676	0.044	1.209		
										0.004	0.114
20	1,276,470	0.854	19.86	0.159	4.543	0.039	1.071	0.004	0.110		
						0.052	1.429			-0.004	-0.114
57	420,920	0.877	17.54	0.193	5.514					-0.007	-0.2
						0.074	2.114	0.022	0.629		

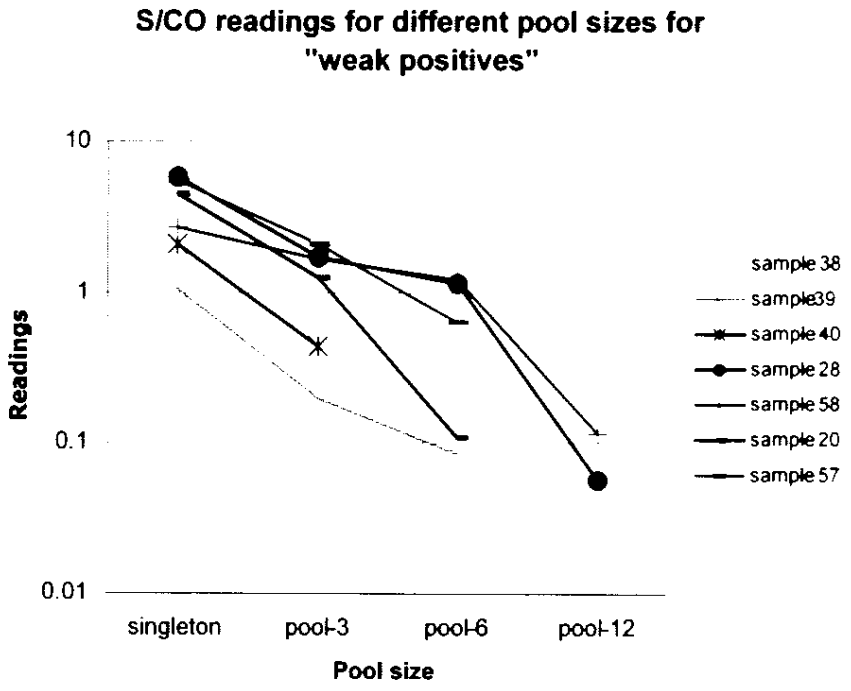
Graph 1:HCV-Ag results on "strong positive" samples



Graph 2: HCV-Ag results on "intermediate positive" samples



Graph 3: HCV-Ag results on "weak positive" samples



Results of the preliminary stage – conclusions:

The results of the preliminary experiments show that there are grounds for continuing the study plan and protocols as planned.

Even though the pools of 12 did not give a positive result in any of the weak samples and in some of the intermediate samples, it has been suggested to continue testing pools up to 12, in the seroconversion experiments for the following reasons:

1. To study the upper limits of the pool size, for detection of a positive signal.
2. Most of the samples that were used in the preliminary experiments have undergone prolonged storage or multiple freeze/thaw cycles, and may have been damaged.
3. The proposed testing comes in addition to the current screening procedure for the detection of infection markers for HCV. Therefore, by definition, their introduction may only increase the sensitivity of the screening. This fact allows us to be more lenient with our sensitivity demands.

The decision to test with pools of 12 is valid for the seroconversion panel stage, and will be reassessed after reviewing the results of this stage, before continuing to the last stage of the study (experimenting with routine blood donations).

I. C) Scientific Impact of Cooperation

The cooperative activities between the different study sites at this stage are described in the reports of the different planning sessions (see appendix 1) and training sessions (as described in section II.C).

I. E) Strengthening of Middle Eastern Institutions

The training sessions contributed to upgrade the knowledge of lab technicians, in all 3 sites, in applying a newly developed screening test.
Purchasing equipment upgraded the lab setup.

I. F) Future Work

After performing the proficiency panel, we will perform experiments with the seroconversion panels and start working on the last phase of the project - Testing of specimens collected from blood donors from routine blood banks work in MDA and Gaza.

Section II. PROJECT MANAGEMENT AND COOPERATION

II. A) Managerial Issues

Due to the harsh political situation, we had experienced some difficulties and got off to a slow start on this project. It has been very difficult to hold planning, and especially training sessions, which have been canceled and rescheduled many times.

At the stage of the preliminary experiments, it became evident that there is a need to purchase a washer for use in the EPRI study site. Therefore, a washer has been purchased for the EPRI lab.

II. C) Cooperation, Travel, Training and Publications

During the reported period, the study team has held 6 planning sessions and 3 conference calls (See summary of these meetings in Appendix 1).

There were also almost daily phone calls and E-mail contacts between the counterparts, especially with EPRI where these means of communication compensated for the lack of actual frequent face-to-face contact.

The training sessions included:

1. Training of BGU staff at MDA.
2. Training of both BGU and MDA staff at MDA by a Hamilton technician after installing the new AT-win program for the automated sampler.
3. Training of MDA and BGU staff in MDA by OCD representatives in Israel (Dover company) that introduced the HCV-Ag assay.
4. Training the EPRI staff at BGU on the principals of manual ELISA tests.
5. Training of EPRI staff in Belgium – by OCD.
6. Training of EPRI staff at MDA for performing the HCV-Ag screening assay, and the confirmatory kit.
7. Training of EPRI and BGU staff on the washer purchased for EPRI.

(See Appendix 2)

II. D) Request for USAID Actions

We would like to thank the personnel of the scientific attaché office at the American Embassy, for assisting us with obtaining entry permits for our counterparts from Gaza. We also appreciate very much the fact that they made themselves available whenever needed and their promptness in solving problems. We will be most grateful to continue receiving such great assistance in the future.

Appendices

Appendix 1

Summary of planning sessions of the study participants

Date	BGU	MDA	EPRI	BU	Place	Topic discussed
Feb.2	*	*	* (by conf. call		MDA	The study plan ; Equipment required;
Feb. 19		*			MDA	Meeting with representatives of DOVER and Hamilton company.
Feb.23	*	*			Conf. call	Further planning
Feb.3	*				BGU	protocols
March 17	*	*			Conf. call	Study plan; manpower recruitment
April 28	*				BGU	Protocols
May 13	*	*			Conf. call	Dividing the work at each stage of the study.
June 16-17	*			*	BU	Study plan and protocols
June 25	*	*	*		MDA	Meeting with Dr. Metz – study progress and discussions
July 27	*	*	*		Conf. call	Further planning of the preliminary experiments, and training sessions
Sept. 29	*	*	* (by conf. call		MDA	Discussing the results of the preliminary experiments, drawing conclusions effecting future work
Nov. 20	*	*	*		BGU	Meeting with Dr. Metz and Dr. Reinhart – study progress and discussions

Appendix 2

Summary of training sessions

Date	Participants	Training Site	Subject of training
2/3	BGU	MDA	Pooling with the automated sampler
16/3	BGU	MDA	PCR testing
23/3 30/3	BGU, MDA	MDA	Pooling with the AT-win program on the automated sampler (given by Hamilton representative)
27/4 26/5 29/5 2/6	BGU, MDA	MDA	Using the HCV-Ag kit (given by DOVER company)
8/8	EPRI	BGU	The principals of working with a manual ELISA test
14/8	EPRI, BGU	MDA	Working with the HCV-Ag kit
23-24/9	EPRI	Belgium ORTHO company	Working with the HCV-Ag assay
22/10	BGU	MDA	Performing the HCV confirmatory test
13/11	EPRI	MDA	Performing the HCV confirmatory- test
25/12	EPRI,BGU	BGU	Getting acquainted with the newly purchased washer (given by NEOTEC representative)