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***Guidelines for Evaluating the Potential
Health Effects of Long-Term Use of Radar
Units on Police Traffic Officers***

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TECHNICAL MEMORANDUM

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NOTE: Further information
about this report can be
obtained by calling the
CPRC information number
(613) 998-6343

Executive Summary

The Canadian Police Research Centre on behalf of the Canadian Association of Chiefs of Police and the Canadian Police Association is considering contracting, when funding is found, with the Clinical Epidemiology Unit(CEU), Loeb Research Institute, Ottawa Civic Hospital. The CEU is going to assess current information on the safe use of radar units. They also, are going to survey the Canadian police community on the possible harmful effects of long-term use of radar units. The survey will also examine the relationship between radar unit usage and the incidence of testicular cancer.

Today there is much interest in radar safety. In order to assess the safety and possible side effects of exposure to traffic radar guns it is proposed that a number of issues need to be addressed are:

- types of radar guns in use,
- exposure factors,
- patterns of radar gun useage,
- potential cancers,
- current health status and
- risk of getting a particular form of cancer among people who work, with police radar as opposed to the rest of the population.

In addition, two questionnaires will be used to address the above. One will be given to the police officer and the other to the police department.

Once completed the project will possibly answer the many questions concerning the use of radar units by police traffic officers.

Résumé

Agissant au nom de l'Association canadienne des chefs de police et de l'Association canadienne des policiers, le Centre canadien de recherches policières envisage de retenir, lorsque les fonds nécessaires auront été obtenus, les services de l'Unité d'épidémiologie clinique (UEC), de l'Institut Loeb pour la recherche médicale et de l'Hôpital Civic d'Ottawa. L'UEC évaluera les données existant sur l'utilisation sécuritaire des appareils radar. Elle effectuera également une étude auprès des corps policiers du Canada afin de déterminer les effets néfastes possibles de l'utilisation prolongée des appareils radar. Cette étude portera aussi sur le rapport entre l'utilisation des appareils radar et le cancer des testicules.

De nos jours, on constate un intérêt marqué pour les questions de sécurité liées aux appareils radar. Afin d'évaluer les risques et les effets secondaires de l'exposition aux rayonnements radars de vitesse, on recommande que les questions ci-après soient étudiées :

- types de pistolets radar utilisés;
- facteurs d'exposition;
- habitudes d'utilisation des pistolets radar;
- formes de cancers possibles;
- situation actuelle sur le plan de la santé;
- possibilités d'être atteintes d'une forme particulière de cancer chez les personnes travaillant avec des appareils radar de la police par rapport au reste de la population.

En outre, deux questionnaires portant sur les sujets ci-dessus seront distribués; le premier sera remis aux policiers et le deuxième aux autorités des corps policiers.

Les résultats de ces études permettront peut-être de répondre aux nombreuses questions portant sur l'utilisation des appareils radar par les agents de police chargés de la circulation.

SYNOPSIS
“Guideline for Evaluating the Potential Health Effects
of Long-term Use of Radar units
on Police Traffic Officers”

For: The Canadian Police Research Centre

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EXECUTIVE SUMMARY

Introduction

This guideline is in response to the Canadian Police Research Centre and the Canadian Police Association request for professional services to assess existing information and conduct a comprehensive survey for evaluating the potential effects of long-term use of radar units on police traffic officers and, in particular, the relationship between radar unit usage and the incidence of testicular cancer.

This proposal is backed by the full resources of the Clinical Epidemiology Unit, Loeb Research Institute, Ottawa Civic Hospital.

Terms of Reference

The Canadian Police Research Centre and the Canadian Police Association require professional health research services to:

- review the existing information regarding: the types and availability of radar units used; measures of the duration, degree and circumstances of exposure to the non-ionizing radiation of radar units; clinical outcomes related to exposure; and other possible risk factors and outcomes.
- formulate an experimental protocol that will include: a classification system for exposure; a methodology for dealing with the temporal characteristics of exposure; a consideration of the variety of cancers and their natural history; and the identification and selection of different exposure and control groups.
- develop a set of measurement instruments, including self-administered questionnaires, clinical assessment forms, history and physical examination forms, and follow-up report.
- incorporate the materials developed in the above tasks and formulate a proposal containing a comprehensive research survey protocol for consideration.
- implement and conduct the survey and analyze, interpret and report the results.

Solution Highlights

The successful completion of the protocol development phase and protocol implementation phase of the Canadian Radar Unit Research Project is marked by the completion of a number of activities. Each of the activities will result in a deliverable and these deliverables are linked to the milestone schedule. As a result, the milestones will identify progress over the project schedule and also provide a measure of performance against the project budget.

The project manager will be a senior member of the Clinical Epidemiology Unit. The project manager's sole function will be just that, to control and manage the progress and production of the deliverables in accordance with the terms of the contract.

A project start up meeting will be held with the Canadian Police Association and the Canadian Police Research Centre to ensure everyone understands the work strategy, plan and schedule and that all participants fully understand their role and responsibilities.

The team will utilize appropriate: statistical analysis strategies to assess existing records; methodological design, classification systems and estimation techniques to enhance the experimental protocol; and state of the art methodologies to develop and design the required measurement instruments (scales, questionnaires and reports).

These various components will be developed and designed to be integrated into a comprehensive proposal for a Canadian Radar Unit Survey Research Project.

BACKGROUND SUMMARY

In the recent past an increased awareness and concern has developed regarding the use of and exposure to common sources of radiation. In particular, sources of continual or prolonged exposure such as those often found in the workplace; ultraviolet and visible light sources, radio frequencies, electric and magnetic fields, and microwaves.' These sources are examples of non-ionizing radiation.

Differences between ionizing and non-ionizing radiation:

Non-ionizing radiation differs from ionizing radiation (such as x-rays) in its biological effect on living cells. Ionizing radiation can create ions within living cells at excessive levels, thus disrupting normal functions and causing irreparable damage. The primary effect of non-ionizing radiation is cell heating which lasts only as long as the exposure, with temperatures returning to normal within a few minutes following exposure. Non-ionizing radiation is not known to cause changes over time. However, the literature demonstrates discordance among scientists and researchers alike regarding the potential side effects of these rays as well as safety of prolonged or continuous exposure.

Adverse effects suggested by various studies include: birth defects; temporary sterility; behavioral changes; haematologic, immunologic and endocrine changes; cancer promotion and co-carcinogenesis. Epidemiologic studies confirming the relationships of these diseases to radiation exposure are sparse if at all existent.

Traffic control units - 'radar guns'

Radar guns for the purpose of traffic control use non-ionizing radiation in the form of long wave, low frequency, low energy microwave and radio frequency (MW/RF) emissions. Research has been conducted on the radiation levels emitted by the radar equipment and conformation to occupational safety standards. Studies performed both in the United States and Canada have indicated that the units emit radiation levels well below restrictions. Units were also deemed safe when operated in accordance with the manufacturers' instructions. Consideration was not given to the actual methods of use by the officers, or the implications of long periods of exposure spanning a considerable time frame.

Concern has risen among police forces and involved officers with increased reports of cancer among traffic control officers who have used the radar guns for several years. Of particular interest is a possible relationship between the units and several cases of testicular cancer; officers reportedly place the unit (with the power on) in their lap when not in use.

Are they safe?

Several police forces and departments in Canada and the United States are querying the safety of the radar gun units in spite of the lack of evidence that they may pose a danger. Forces in the U.S. have gone as far to eliminate use of the units completely until studies have confirmed their safety. Guidelines and safety practices have been reviewed and emphasize safety measures. However, it is agreed that formal, epidemiologic studies are needed to assess actual patterns and methods of use, and the implications of frequency and duration of exposure.

In order to assess the safety and possible side effects of exposure to traffic radar guns, the following issues must be addressed:

1. What types of radar guns are used?

- . the majority of research which has been done on the actual units is primarily from U.S. sources. Results are not applicable to Canadian units, as manufacturers are different, as are models.
- . because models and makes may vary within each force/department it will be necessary to determine the following for each model in use:
 - frequency, power density and wave form.
- . a literature search will provide further insight into the role of microwaves and non-ionizing radiation in disease development/progression

2. **Exposure factors**

. it has been recognized the duration and time course of exposure are important variables in determining biological response. Formulae for specific absorption rates for different unit models will be applied as necessary

• factors which may amplify or reduce exposure will also be looked at (ie. reflection of rays from metal or glass; absorption of rays by rubber soled footwear)

3. **Patterns of radar gun use**

. guidelines and training for safe handling of radar units will be investigated

. regular patterns of use will be reviewed according to guidelines and training

. position of radar device in patrol car will be assessed. Some literature suggests that exposure hazards increase with particular placements and use of radar guns in automobiles. Similar studies refute this belief.

4. **Potential cancers**

. the relationship of interest is that between the radar gun and incidence of testicular cancer

. due to the implied relationship of non-ionizing radiation and several cancer forms, a broader spectrum of cancers will be considered

5. **To determine whether the risk of getting a particular form of cancer is increased among people who work with radar devices than the rest of the population**

. information similar to that collected from traffic officers will be collected for a sampling of officers who have never used a radar gun or participated in traffic duty where a radar gun was being used/present. This sample will be age and gender matched to the sample of traffic officers for comparison.

. incidence of disease will be compared to population standards as indicated by Statistics Canada figures

6. Other exposure

. consideration will be given to environmental factors which may be considered carcinogenic (ie radio transmitters which also emit non-ionizing microwave radiation)

7. Health status

. in order to identify other possible side effects related to exposure, comorbidity indexes will be applied to all traffic officers. The majority of the variables involved in studying the potential effects of long-term use of radar guns on police traffic officers, and the relationship between radar gun usage and incidence of testicular cancer will be addressed in two questionnaires:

The Police **Officer** - a mail questionnaire will be used to address each of the above. Officers will be asked:

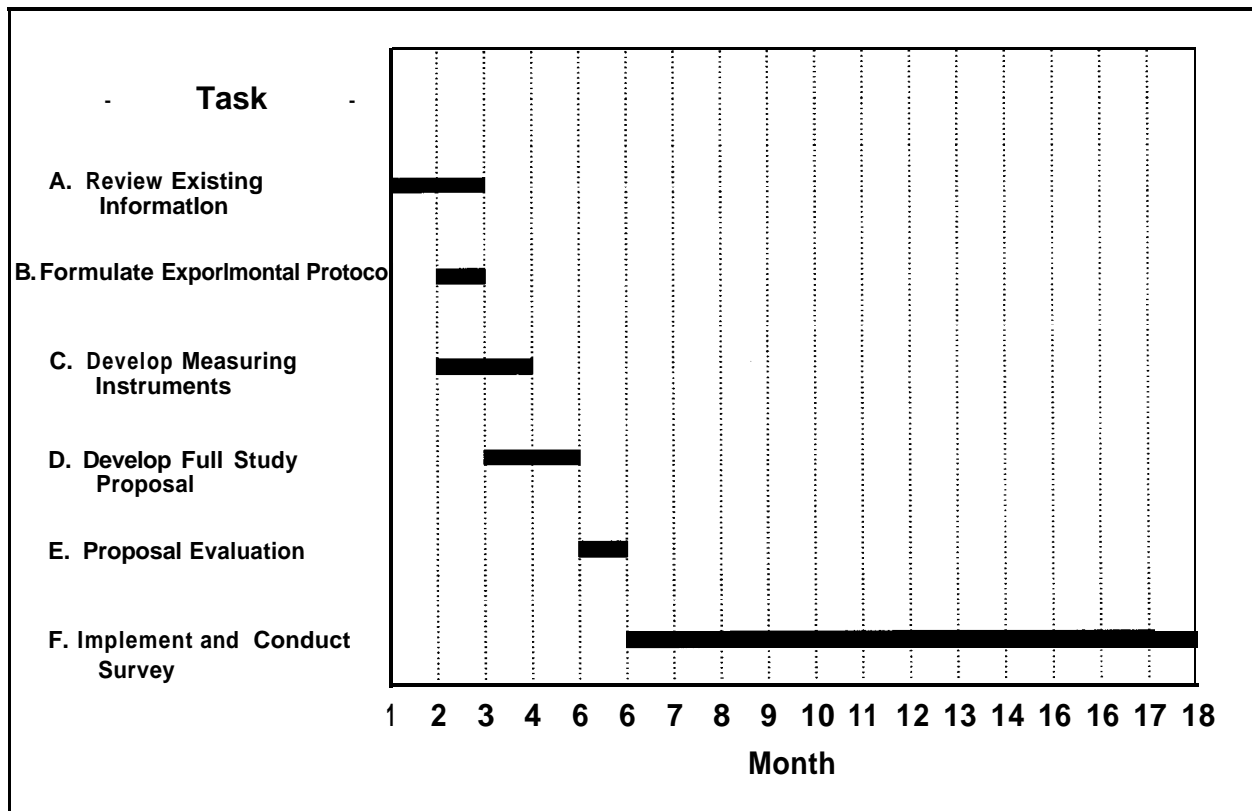
- . what types/models of radar guns they have used
- . how long they have been on traffic patrol
number of years using a radar gun
- . safety/general use training received
handling of the unit when in use
placement of unit when not in use
patterns of use - was the power turned on/off as necessary or did the unit remain turned on for the duration of shift
unit placement in vehicle
operation of unit inside the vehicle
- . diagnosis of any cancer or cancer related illness
- . demographic/personal information
- . exposure to other radiants such as use of walkie talkies, radio transmitters, cellular phones and duration

Police Force - A questionnaire will be sent to participating departments to gather information on specifications for types and models of guns used in the history of the department.

Time and Resource Schedule:

The proposed Project Master Schedule is presented in Figure 1, which shows the major tasks over the project period by weeks after award of the contract.

Figure 1: Proposed Project Master Schedule



The eighteen month proposal's budget is \$254,388.