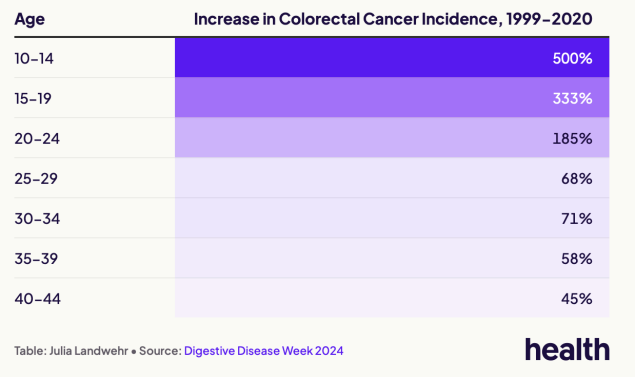
New Clues on Colorectal Cancer Among Young Adults

Higher Risks When Cell Phone Is Carried Below the Waist

September 30, 2024

It's a long-running medical mystery: Why have so many people under 50 in affluent countries been developing colorectal cancer in recent decades?

Something new is triggering a jump in what's known as early-onset colon and rectal cancer (EOCRC). The rates have been going up for the last 20 years and no one knows why it's happening. The usual risk factors for CRC —obesity, smoking, bad diet and lack of exercise— don't fully explain the increase.



Source: *Health,* June 7, 2024

Five years ago, De-Kun Li, a senior epidemiologist at Kaiser Permanente in Oakland, CA, offered a new possibility: carrying a cell phone below the waist. When placed in a pocket below the belt, the phone transmits RF radiation into the abdomen. Given that RF has been shown to cause cancer in animal experiments, Li thought it was a plausible risk factor. (This is what I wrote at the time.)

The idea didn't catch on, but Li persisted and conducted a pilot study to test his hypothesis. It convinced him that he may be onto

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something.

It's a small study, designed to survey 50 cases of EOCRC and 50 matched controls. He found that those who carried a phone below the waist were *four times more likely* to develop tumors.

EOCRC Tumors on the Left Side

Li found that the link between cell phone carrying and EOCRC is strongest when the phone was kept on the same side as where the tumor developed.

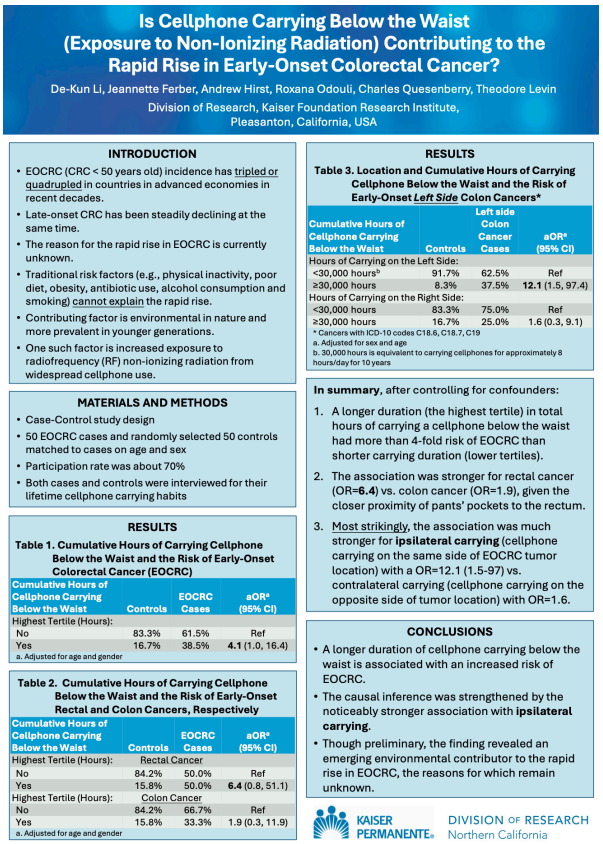
EOCRC tends to develop on the left side of the colon. Those who carried a phone on the left side for more than 30,000 hours were *12 times more likely* to develop a tumor on that side of the colon. This elevated risk for what's called ipsilateral carrying is statistically significant. (36,000 hours is equivalent to about ten years of RF exposure.)

Those who kept the phone on their right side —contralateral carrying— had only a slightly increased CRC risk for *left-side* colon cancer, according to Li.

"The striking contrast between a strong association with ipsilateral carrying and largely no association with contralateral carrying is the most notable finding," Li told me in an email exchange.

There were not enough cases of right-side colon cancer for a right-side carrying risk analysis in this pilot study, but Li believes that if his hypothesis is correct and he were able to do a larger study, a similarly elevated risk would be seen for right-side ipsilateral carrying.

Li presented his results in late August at the annual conference of the International Society of Environmental Epidemiology (ISEE), held this year in Santiago, Chile. His poster paper is below; the ISEE abstract is here.



Is Cellphone Carrying Below the Waist (Exposure to Non-Ionizing Radiation) Contributing to the Rapid Rise in Early-Onset Colorectal Cancer?

De-Kun Li, Jeannette Ferber, Andrew Hirst, Roxana Odouli, Charles Quesenberry, Theodore Levin
Division of Research, Kaiser Foundation Research Institute, Pleasanton, California, USA

INTRODUCTION

- EOCRC (CRC < 50 years old) incidence has tripled or quadrupled in countries in advanced economies in recent decades.
- Late-onset CRC has been steadily declining at the same time.
- The reason for the rapid rise in EOCRC is currently unknown.
- Traditional risk factors (e.g., physical inactivity, poor diet, obesity, antibiotic use, alcohol consumption and smoking) cannot explain the rapid rise.
- Contributing factor is environmental in nature and more prevalent in younger generations.
- One such factor is increased exposure to radiofrequency (RF) non-ionizing radiation from widespread cellphone use.

MATERIALS AND METHODS

- Case-Control study design
- 50 EOCRC cases and randomly selected 50 controls matched to cases on age and sex
- Participation rate was about 70%
- Both cases and controls were interviewed for their lifetime cellphone carrying habits

RESULTS

Table 1. Cumulative Hours of Carrying Cellphone Below the Waist and the Risk of Early-Onset Colorectal Cancer (EOCRC)

Cumulative Hours of Cellphone Carrying Below the Waist	Controls	EOCRC Cases	aOR[a] (95% CI)
Highest Tertile (Hours):			
No	83.3%	61.5%	Ref
Yes	16.7%	38.5%	**4.1** (1.0, 16.4)

a. Adjusted for age and gender

Table 2. Cumulative Hours of Carrying Cellphone Below the Waist and the Risk of Early-Onset Rectal and Colon Cancers, Respectively

Cumulative Hours of Cellphone Carrying Below the Waist	Controls	EOCRC Cases	aOR[a] (95% CI)
Highest Tertile (Hours):	Rectal Cancer		
No	84.2%	50.0%	Ref
Yes	15.8%	50.0%	**6.4** (0.8, 51.1)
Highest Tertile (Hours):	Colon Cancer		
No	84.2%	66.7%	Ref
Yes	15.8%	33.3%	1.9 (0.3, 11.9)

a. Adjusted for age and gender

RESULTS

Table 3. Location and Cumulative Hours of Carrying Cellphone Below the Waist and the Risk of Early-Onset *Left Side* Colon Cancers*

Cumulative Hours of Cellphone Carrying Below the Waist	Controls	Left side Colon Cancer Cases	aOR[a] (95% CI)
Hours of Carrying on the Left Side:			
<30,000 hours[b]	91.7%	62.5%	Ref
≥30,000 hours	8.3%	37.5%	**12.1** (1.5, 97.4)
Hours of Carrying on the Right Side:			
<30,000 hours	83.3%	75.0%	Ref
≥30,000 hours	16.7%	25.0%	1.6 (0.3, 9.1)

* Cancers with ICD-10 codes C18.6, C18.7, C19
a. Adjusted for sex and age
b. 30,000 hours is equivalent to carrying cellphones for approximately 8 hours/day for 10 years

In summary, after controlling for confounders:

1. A longer duration (the highest tertile) in total hours of carrying a cellphone below the waist had more than 4-fold risk of EOCRC than shorter carrying duration (lower tertiles).
2. The association was stronger for rectal cancer (OR=**6.4**) vs. colon cancer (OR=1.9), given the closer proximity of pants' pockets to the rectum.
3. Most strikingly, the association was much stronger for **ipsilateral carrying** (cellphone carrying on the same side of EOCRC tumor location) with a OR=12.1 (1.5-97) vs. contralateral carrying (cellphone carrying on the opposite side of tumor location) with OR=1.6.

CONCLUSIONS

- A longer duration of cellphone carrying below the waist is associated with an increased risk of EOCRC.
- The causal inference was strengthened by the noticeably stronger association with **ipsilateral carrying**.
- Though preliminary, the finding revealed an emerging environmental contributor to the rapid rise in EOCRC, the reasons for which remain unknown.

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De-Kun Li's Poster Presentation at ISEE 2024 in Santiago (click to expand)

Another Opinion

As it happened, Kurt Straif was also going to the Santiago meeting, and I asked him to check out Li's paper. Straif, formerly the head of the IARC Monograph Section in Lyon, now has appointments at Boston College in the U.S. and ISGlobal in Spain. He oversaw the 2011 IARC meeting where RF radiation was judged to be a possible human carcinogen. Straif is currently a member of the team preparing a systematic review of the RF–animal cancer literature for the WHO's EMF Project.

"I'm skeptical," Straif told me when he got back from Chile. "It's a small study reporting implausibly strong associations with very wide confidence intervals." Straif is not yet willing to discount the existing CRC risk factors for the rise in EOCRC. They —particularly obesity — are still "plausible, at least partially," he said, especially given that there is "no robust evidence for new risk factors, environmental or otherwise."

In any case, Straif continued, the timing is off: Widespread use of mobile phones among younger people "comes only after the dramatic increase of EOCRC, especially when you take into account a latency period between exposure and disease."

I asked Li to address Straif's concerns. He acknowledged that the numerical risk estimates should not be taken too literally given the relatively small sample size of the pilot study. "They could have been smaller or larger," he said. "It's the striking difference between

the ipsilateral and contralateral risks that we should pay attention to."

Li also disagrees with Straif on the timing: "Cell phones became popular before the steady rise in EOCRC incidence," he said. "Of course, the unknown part is the latency: We do not know how long the latency is for EOCRC."

"Please remember that genetically susceptible individuals will get EOCRC first whenever a new environmental risk factor enters the fray," Li said.

American Cancer Society Not on Board

I sought a second opinion from Rebecca Siegel, a senior researcher at the American Cancer Society. Siegel publishes regular updates on CRC statistics and has for years raised concern over the increasing rates of EOCRC among the young —against the backdrop of the declining rates among those over 50 (late onset CRC).

I sent Siegel Li's abstract and asked her whether, given the lack of progress* in explaining the rise in EOCRC, Li's results are persuasive enough to go forward with a more statistically reliable study.

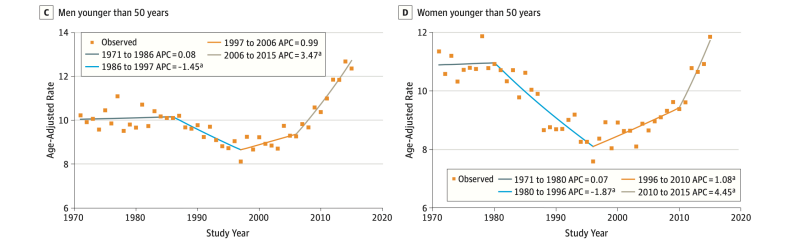
"Very interesting," Siegel replied, but then all but dismissed Li's hypothesis. She also questioned the timing: It "doesn't really work because rectal cancer rates have been increasing since the 1970s and 1980s in people in their 20s and 30s," she wrote, "and cell phone use did not become widespread until the 2000s, with later uptake among kids and teens."

"Actually, cell phone use started to take off in the mid-1990s," Li said. In 1992, for instance, about 11 million Americans were using cell phones, according to CTIA, the wireless trade association. By 1996, the number had grown to more than 44 million, and close to 110 million in 2000.

As to when rates of EOCRC increased, Li said the big jump happened quite a bit later than the 1970s and 1980s. He cites a 2022 review by Frank Sinicrope of the Mayo Clinic in the *New England Journal of Medicine*. Sinicrope states that you can see a "clear change" in EOCRC incidence in the U.S. data: It began in 1994 and ushered in a steady upward trend. "Similar observations of the rising incidence of EOCRC have been reported in other high-income countries," he wrote.

For instance, Sinicrope cites a study of EOCRC rates in 20 European countries, which found that, on average, CRC incidence increased by 7.9% per year among subjects aged 20–29 from 2004 to 2016. The study was published in *Gut*, a BMJ journal, in 2019.

The EOCRC incidence trends in Canada for men and women below show a clear rise beginning in the late 1990s and early 2000s.



Annual percentage changes (APCs) are given for each birth year range.

[a] Indicates that the APC is significantly different from zero at α = .05 level.

Source: *JAMA Open,* July 31, 2019 (click to expand)

What Now?

In the end, neither Straif nor Siegel would endorse a larger study to fully test Li's hypothesis.

As for the next step, Li is planning to apply for federal funding to do a larger study. "If my hypothesis is correct," he said, "it carries great public health significance because just about the entire population may be at risk."

In closing, Li stressed that even if carrying a cell phone below the waist only partially explains the rise of EOCRC, it's "easily preventable": "All you would need is public education; it wouldn't cost anything more."

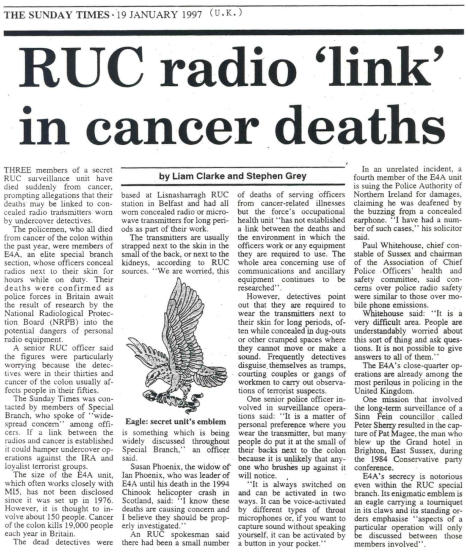
An Early Warning

We may have had a warning about the dangers of putting transmitters in our trousers —or under them— some 30 years ago.

In January 1997, the U.K. *Sunday Times* reported that three members of an elite police unit (E4A) of the Royal Ulster Constabulary (RUC) had died of colon cancer, after doing undercover surveillance work in Northern Ireland. The officers concealed radio transmitters "in the small of the back or next to the kidneys," the newspaper was told (see clip below and *MWN,* J/F97.)

"The detectives were in their thirties and cancer of the colon usually affects people in their fifties," the *Sunday Times* stated.

"Concerns over police radio safety were similar to those over mobile phone emissions," a police health and safety official told the *Times.*



THE SUNDAY TIMES · 19 JANUARY 1997 (U.K.)

RUC radio 'link' in cancer deaths

by Liam Clarke and Stephen Grey

THREE members of a secret RUC surveillance unit have died suddenly from cancer, prompting allegations that their deaths may be linked to concealed radio transmitters worn by undercover detectives.

The policemen, who all died from cancer of the colon within the past year, were members of E4A, an elite special branch section, whose officers conceal radios next to their skin for hours while on duty. Their deaths were confirmed as police forces in Britain await the result of research by the National Radiological Protection Board (NRPB) into the potential dangers of personal radio equipment.

A senior RUC officer said the figures were particularly worrying because the detectives were in their thirties and cancer of the colon usually affects people in their fifties.

The Sunday Times was contacted by members of Special Branch, who spoke of "widespread concern" among officers. If a link between the radios and cancer is established it could hamper undercover operations against the IRA and loyalist terrorist groups.

The size of the E4A unit, which often works closely with MI5, has not been disclosed since it was set up in 1976. However, it is thought to involve about 150 people. Cancer of the colon kills 19,000 people each year in Britain.

The dead detectives were based at Lisnasharragh RUC station in Belfast and had all worn concealed radio or microwave transmitters for long periods as part of their work.

The transmitters are usually strapped next to the skin in the small of the back, or next to the kidneys, according to RUC sources. "We are worried, this is something which is being widely discussed throughout Special Branch," an officer said.

Eagle: secret unit's emblem

Susan Phoenix, the widow of Ian Phoenix, who was leader of E4A until his death in the 1994 Chinook helicopter crash in Scotland, said: "I know these deaths are causing concern and I believe they should be properly investigated."

An RUC spokesman said there had been a small number of deaths of serving officers from cancer-related illnesses but the force's occupational health unit "has not established a link between the deaths and the environment in which the officers work or any equipment they are required to use. The whole area concerning use of communications and ancillary equipment continues to be researched".

However, detectives point out that they are required to wear the transmitters next to their skin for long periods, often while concealed in dug-outs or other cramped spaces where they cannot move or make a sound. Frequently detectives disguise themselves as tramps, courting couples or gangs of workmen to carry out observations of terrorist suspects.

One senior police officer involved in surveillance operations said: "It is a matter of personal preference where you wear the transmitter, but many people do put it at the small of their backs next to the colon because it is unlikely that anyone who brushes up against it will notice.

"It is always switched on and can be activated in two ways. It can be voice-activated by different types of throat microphones or, if you want to capture sound without speaking yourself, it can be activated by a button in your pocket."

In an unrelated incident, a fourth member of the E4A unit is suing the Police Authority of Northern Ireland for damages, claiming he was deafened by the buzzing from a concealed earphone. "I have had a number of such cases," his solicitor said.

Paul Whitehouse, chief constable of Sussex and chairman of the Association of Chief Police Officers' health and safety committee, said concerns over police radio safety were similar to those over mobile phone emissions.

Whitehouse said: "It is a very difficult area. People are understandably worried about this sort of thing and ask questions. It is not possible to give answers to all of them."

The E4A's close-quarter operations are already among the most perilous in policing in the United Kingdom.

One mission that involved the long-term surveillance of a Sinn Fein councillor called Peter Sherry resulted in the capture of Pat Magee, the man who blew up the Grand hotel in Brighton, East Sussex, during the 1984 Conservative party conference.

E4A's secrecy is notorious even within the RUC special branch. Its enigmatic emblem is an eagle carrying a tourniquet in its claws and its standing orders emphasise "aspects of a particular operation will only be discussed between those members involved".

(click to expand)

FOOTNOTE

* Progress on finding a cause for EOCRC has been elusive. Here's an example of how little has changed: Between 2017 and 2023, Siegel published three statistical reviews of CRC. Each closes with the same call for more research on what is driving the jump in EOCRC:

- 2017: "Finally, more research is needed to elucidate causes for the increasing burden of CRC in young adults…"
- 2020: "In addition, research is needed to elucidate causes for the rising CRC incidence in young and middle-aged adults…"
- 2023: "In addition, research is needed to elucidate causes for rising CRC incidence…"

colorectal cancer, EOCRC, De-Kun Li, Kurt Straif, American Cancer Society, Rebecca Siegel, cancer trends, Frank Sinicrope,

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