

Physical hazards in fetuses and newborns

Electromagnetic fields: Our data

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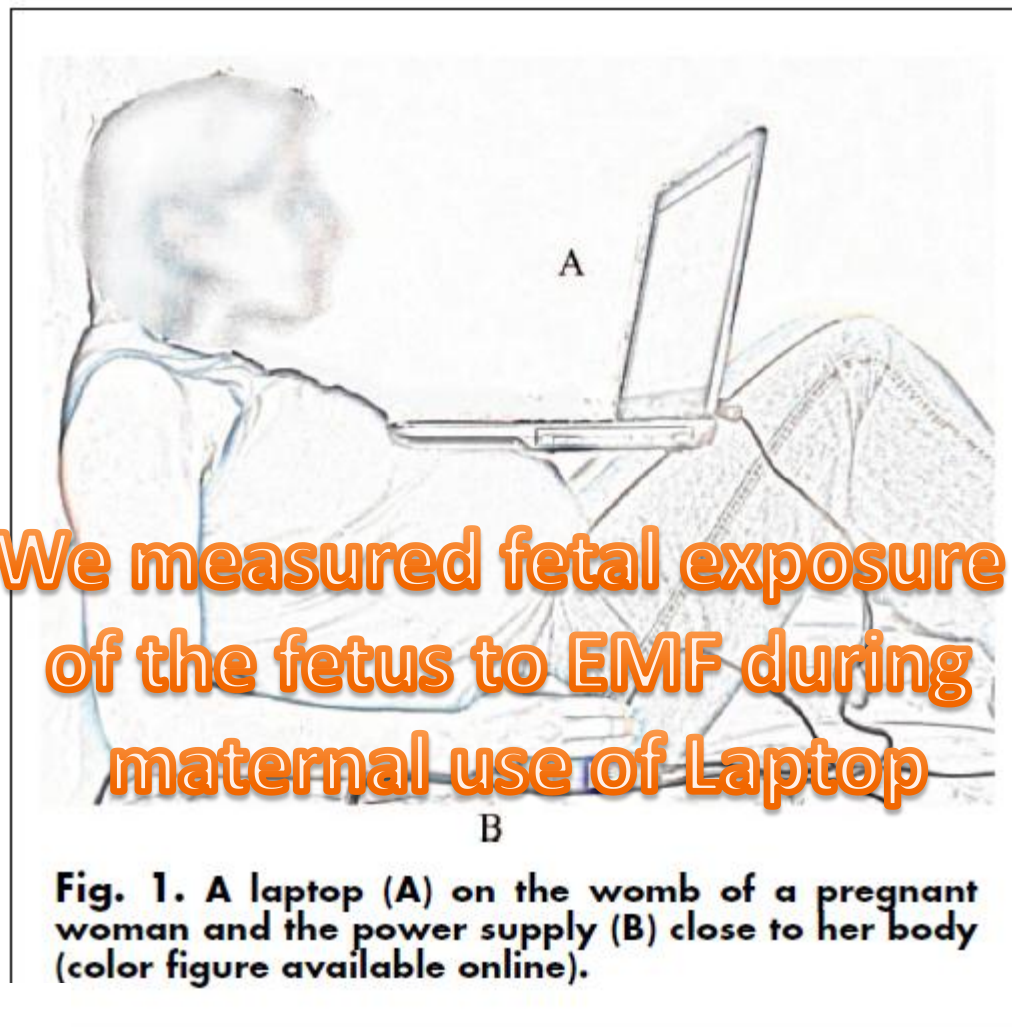


Electromagnetic fields are
a concern for adults;
But babies and fetuses are at risk, as well...

Inserire testo

Fetal
exposure to EMF
during maternal use
of Laptops

Fetal exposure of the fetus to EMF during maternal use of Laptops



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Exposure to Electromagnetic Fields
From Laptop Use of "Laptop"
Computers

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D. Andreuccetti, MS; G. Buonocore, PhD

Table 1.—EMF Emissions From Laptops (Laptop) and From Power Supply (p.s.) Investigated

Model	B _{max} (μT)	Frequency (Hz)	WPJ (%)
A laptop	3.8	1,000	27
A p.s.	29.5	750	175
B laptop	6	17,960	23
B p.s.	20	750	112
C laptop	2.8	1,025	14
C p.s.	10.5	550	87
D laptop	2.4	360	12
D p.s.	3.58	550	29
E laptop	1.8	800	8
E p.s.	0.7	100	4

Note. Laptop and power supply EMFs measured at the dominant frequency (third column), expressed as percent value of the ICNIRP reference values for the population. Maximum values obtained for each equipment are reported in the column B_{max}.

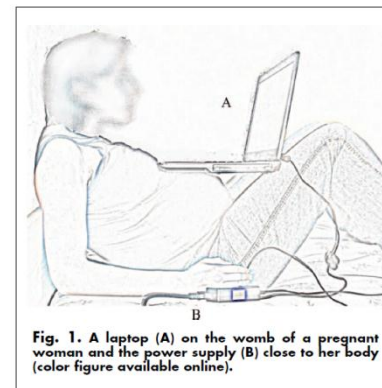


Fig. 1. A laptop (A) on the womb of a pregnant woman and the power supply (B) close to her body (color figure available online).

Table 3.—EMF Emission Limits Prescribed by MRP II and TCO

Magnetic field	MRP II	TCO
ELF (5 Hz to 2 kHz)	<0.25 μT	<0.2 μT
VLF (2 to 400 kHz)	<0.025 μT	<0.025 μT

Note. The recommendations for EMF emission limits prescribed by MRP II and TCO are exceeded in the case of laptop emissions, as results from our measurements show.

Table 2.—Induced Currents as Percentage of ICNIRP Limit for Population From Equipment A

Body tissue	Source	Orientation		
		x	y	z
Fetus	Laptop	34.20	49.80	36.70
Fetus	Power supply	182.0	263.7	195.2
Mother Brain grey matter	Power supply	167.2	168.1	124.1
Mother Brain white matter	Power supply	71.5	72.9	78.6
Mother cerebellum	Power supply	144.3	96.5	126.7
Mother cerebrospinal fluid	Power supply	346.7	483.5	394.4
Mother muscle	Power supply	173.9	228.3	153.5

Note. Induced current on the fetus and on the mother body due to the exposition to laptop A electromagnetic emission expressed in terms of percent of ICNIRP 98 basic restriction for the population.

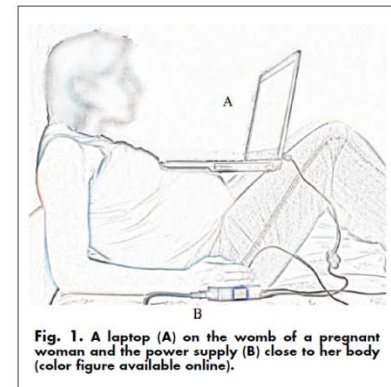


Fig. 1. A laptop (A) on the womb of a pregnant woman and the power supply (B) close to her body (color figure available online).


The mother-fetus couple should receive safeguards from EMF exposure during pregnancy

A laptop can be a source of very high EMF

The laptop use on the belly or on the lap during pregnancy should be discouraged



High-risk newborns spend
much of their first days
at tight contact with high EMFs
produced by the motor of their
incubators



12 cm

30.8°C 30.3°C



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Worry over incubator 'emissions'

Electromagnetic fields from incubators may be interfering with newborn babies' heart rates, claim researchers.

The Archives of Disease in Childhood study found normal changes in heart rates were reduced when the machines were turned on.

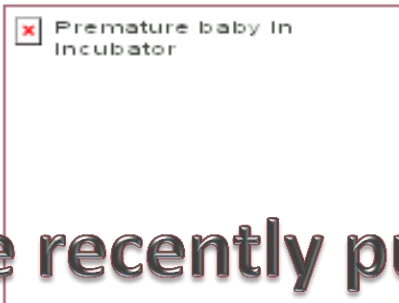
However, the Italian researchers found no hard evidence of any actual health damage caused by incubators.

The Medicines and Healthcare Products Regulatory Authority has received no reports of problems with the equipment.

Many thousands of newborns need an incubator to help keep them healthy, some for many months after birth.

The main job of the machine is to keep the air surrounding the baby warm.

But using its motor creates an electromagnetic field in the area immediately surrounding it, which covers the area where the baby lies.



We have recently published our observations and received space in international press

“ What we have proved is that the effects of these machines are not neutral - and they should be ”

Dr Carlo Bellieni
University of Siena

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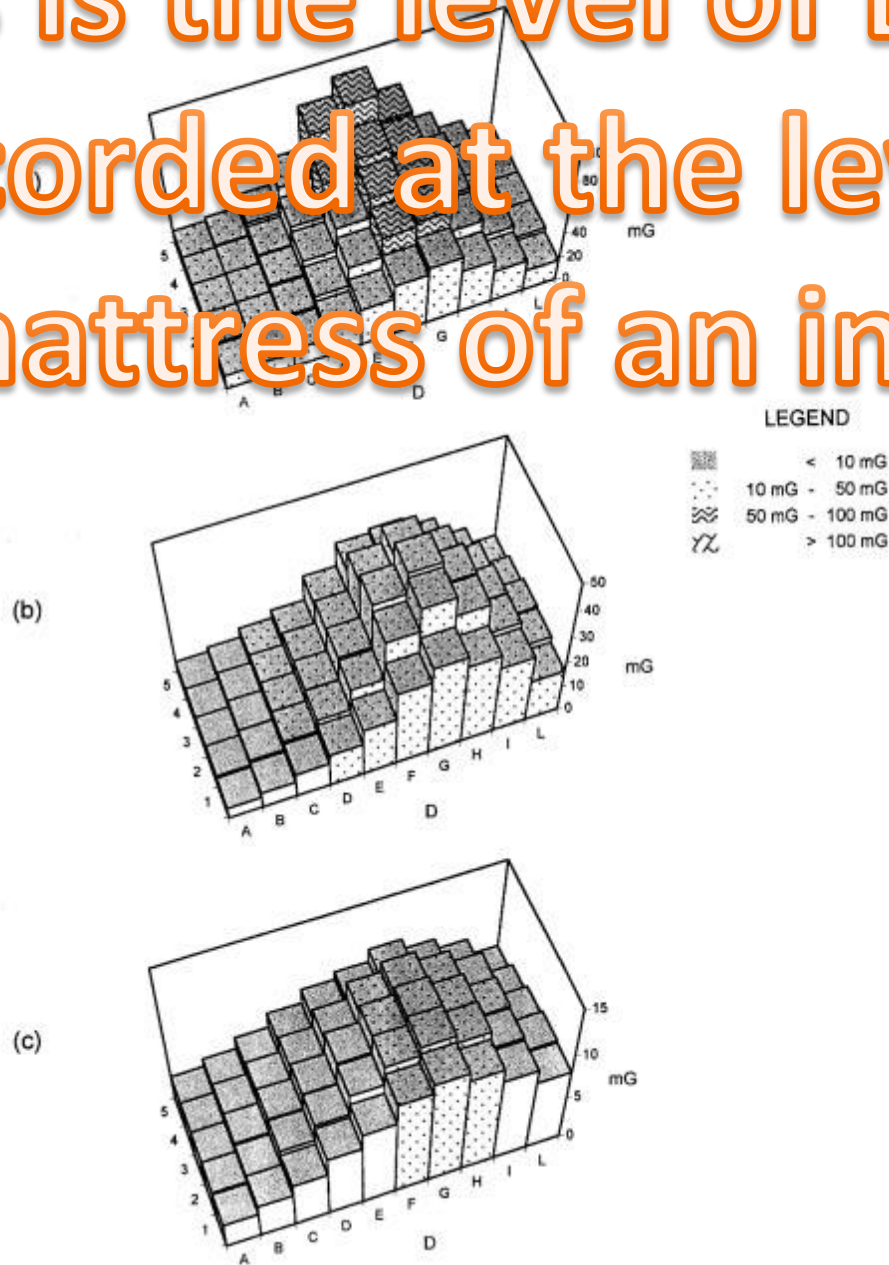
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This is the level of EMF recorded at the level of the mattress of an incubator



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Increasing the engine-mattress distance in neonatal incubators: a way to decrease exposure of infants to electromagnetic fields

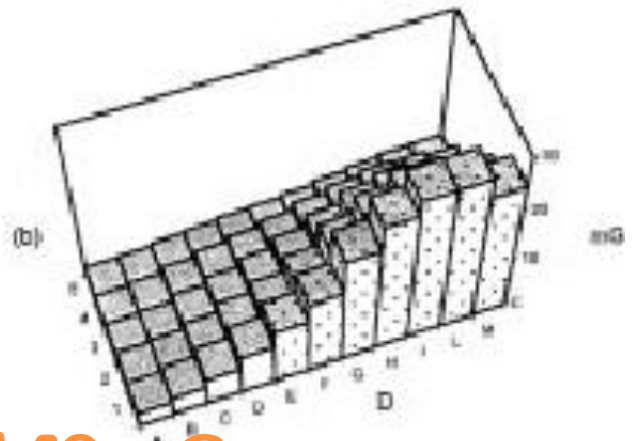
Aumentare la distanza tra il motore e il materasso nelle incubatrici: un modo per ridurre l'esposizione dei neonati ai campi elettromagnetici

C.V. BELLIENI, M. RIGATO, M. FORTUNATO, D.M. CORDELLI, F. BAGNOLI
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Increasing the engine-mattress distance in neonatal incubators: a way to decrease exposure of infants to electromagnetic fields

Aumentare la distanza tra il motore e il materasso nelle incubatrici: un modo per ridurre l'esposizione dei neonati ai campi elettromagnetici

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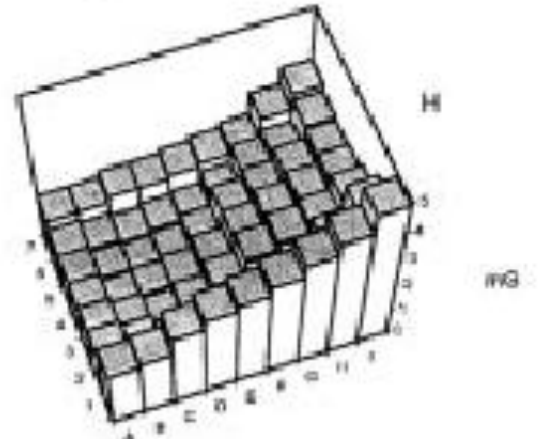
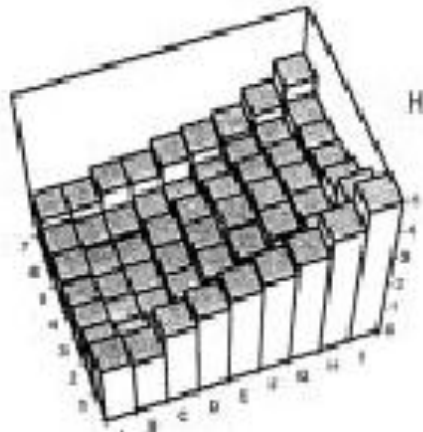
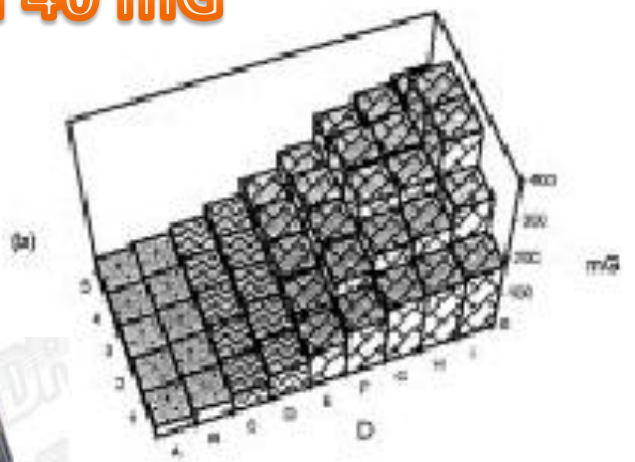


Some incubators exceed 40 mG



LEGEND

- < 10 mG
- 10 mG - 50 mG
- 50 mG - 100 mG
- > 100 mG

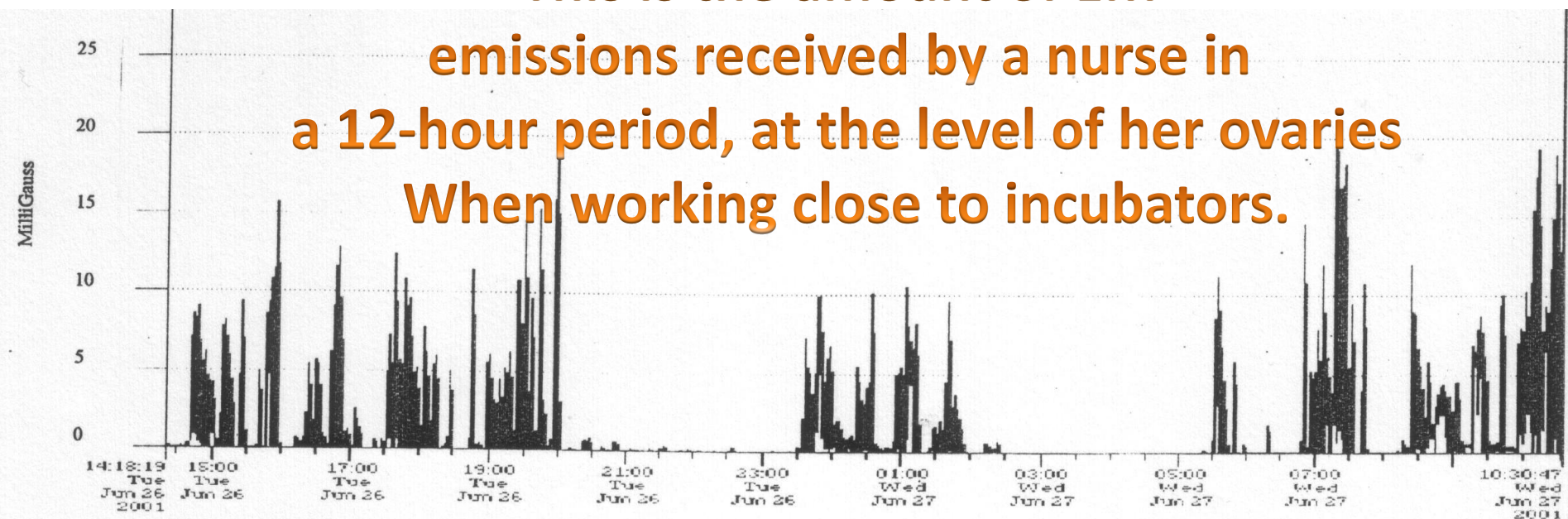


Reduction of exposure of newborns and caregivers to very high electromagnetic fields produced by incubators

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**This is the amount of EM
emissions received by a nurse in
a 12-hour period, at the level of her ovaries
When working close to incubators.**





Electromagnetic fields produced by incubators influence heart rate variability in newborns

carlo bellieni, maurizio acampa, marianna maffei, silvia maffei, sara perrone, iole pinto, nicola stacchini and giuseppe buonocore

Arch. Dis. Child. Fetal Neonatal Ed. published online 1 May 2008;
doi:10.1136/adc.2007.132738

We recorded heart rate variability in a group of newborns exposing them to EMF produced by incubators and removing the exposure:

Turning the incubator on and off and on again, their heart rate variability changes

We also saw that EMF can interfere with Newborns' melatonin production

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Is newborn melatonin production influenced by magnetic fields produced by incubators?

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Previous studies demonstrated a decrease in melatonin production in adults and animals exposed to EMF.

We assessed melatonin production in a group of newborns exposed to EMF, and to evaluate whether removing the babies from the source of MF can affect melatonin production.

We used the mu-metal to shield the motors

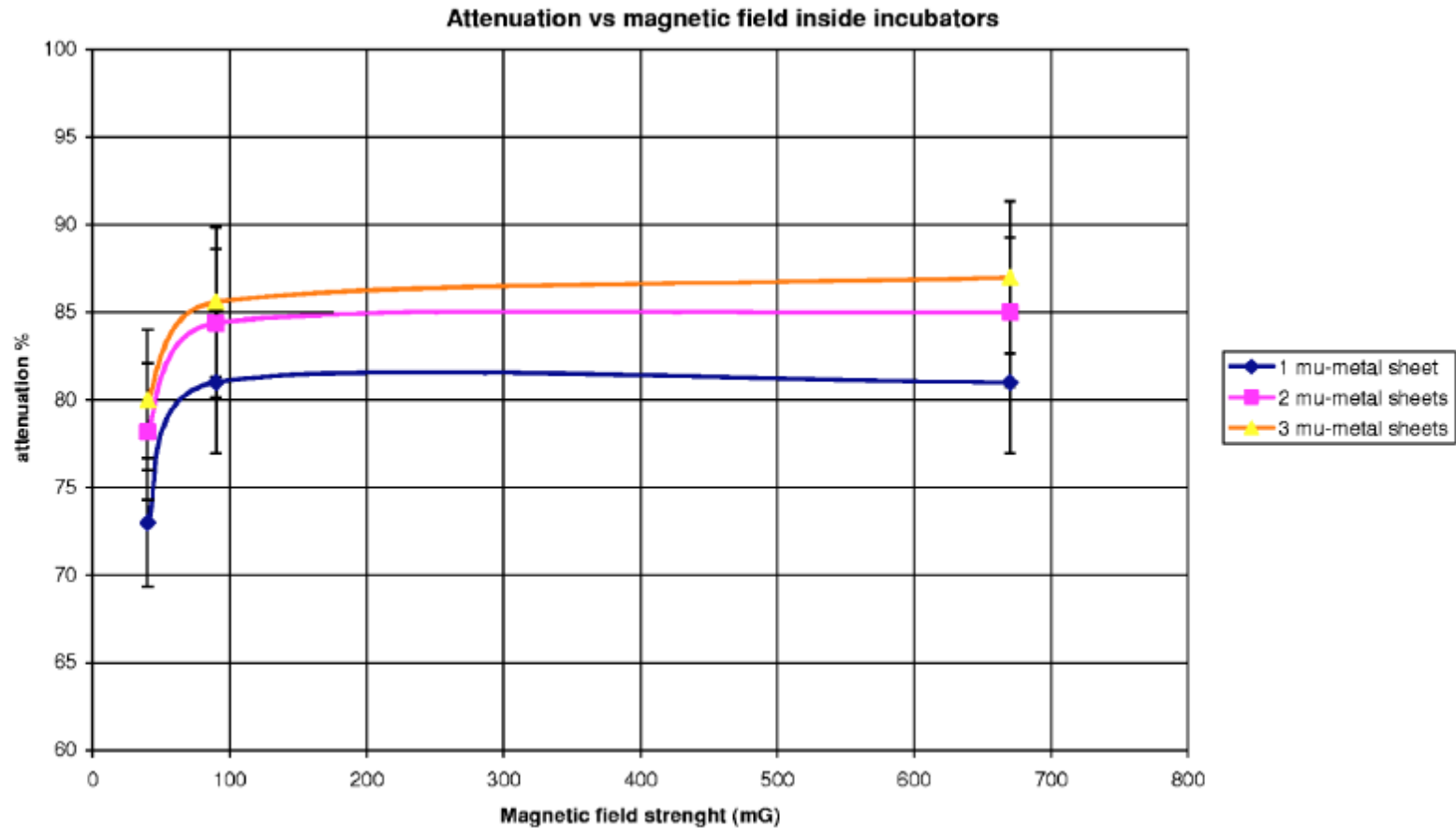


FIG. 2. Percentage attenuation due to different shields.

Reduction of exposure of newborns and caregivers to very high electromagnetic fields produced by incubators

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These data show that in incubators babies are exposed to very high EMF, when they are very rapidly growing up, and have lots of stem cells



This exposure can interfere with their autonomous system and their production of melatonin

We can prevent this with a better engineering of incubators