

# Reducing child lead exposure through a participatory approach: A pilot intervention in Abidjan, Ivory Coast



Project financed by



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## Beyond heterogeneity of toxicants, why participation?

### Not Learning from Others\*

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Matthew Ridley      Frank Schilbach

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<https://www.nber.org/papers/w30378>

#### Abstract

We provide evidence of a powerful barrier to social learning: people are much less sensitive to information others discover compared to equally-relevant information they discover themselves. In a series of incentivized lab experiments, we ask participants to guess the color composition of balls in an urn after drawing balls with replacement. Participants' guesses are substantially less sensitive to draws made by another player compared to draws made themselves. This result holds when others' signals must be learned through discussion, when they are perfectly communicated by the experimenter, and even when participants see their teammate drawing balls from the urn with their own eyes. We find a crucial role for taking some action to generate one's 'own' information, and rule out distrust, confusion, errors in probabilistic thinking, up-front inattention and imperfect recall as channels.

**Keywords:** information aggregation, learning, social learning, experience effects

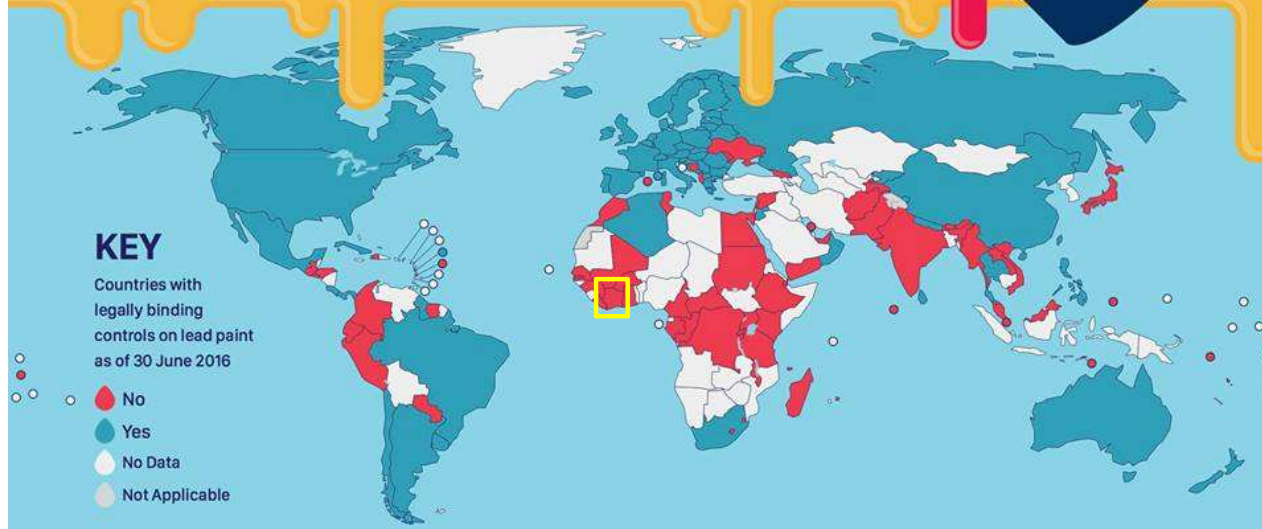
Côte d'Ivoire one of ~50 countries where Pb paint is not banned

# LEAD PAINT MUST GO

#BanLeadPaint

The Global Alliance to Eliminate Lead Paint says that all countries should ban lead paint by **2020**

**FACT:** As of June 2016, only 1/3 of countries have legally binding controls on lead paint



**There is no safe level of lead exposure**



World Health Organization

## Leading brand >10,000 ppm Pb, but low Pb alternatives available



A composite image. On the left, a man in a white shirt and apron is painting a wall with a roller. In the center, a map of Côte d'Ivoire and Ghana is shown, with Abidjan highlighted in Côte d'Ivoire. On the right, a social media overlay for 'ETS NAD' is visible, featuring a logo and contact information. The overlay includes the text 'PEINTURE DURABLE' and 'ORIGINAL Peinture Vinilyque'.

## Lumetallix kit detection limit ~500 ppm Pb based on US and Côte d'Ivoire paint

US federal definition 5,000 ppm, most regulation now ~100 ppm



Instant Lead Detection | Lead Test Kit for Paint, Ceramics & more  
| Fast, Accurate Results | UV Light Visible | Home Safety & Easy  
to Use | Home Lead Test Kit | Lead Paint Test Kit

[Visit the Lumetallix Store](#)

4.2 ★★★★★ (82) | [Search this page](#)

**Amazon's Choice** Overall Pick

300+ bought in past month

-7% \$70<sup>00</sup>

Typical price: \$75.00 ⓘ



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### Lead-based paint detection using perovskite fluorescence and X-ray fluorescence

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<sup>h</sup> Van 't Hoff Institute for Molecular Sciences, University of Amsterdam, Science Park 904, Amsterdam, 1090 GD, The Netherlands

#### HIGHLIGHTS

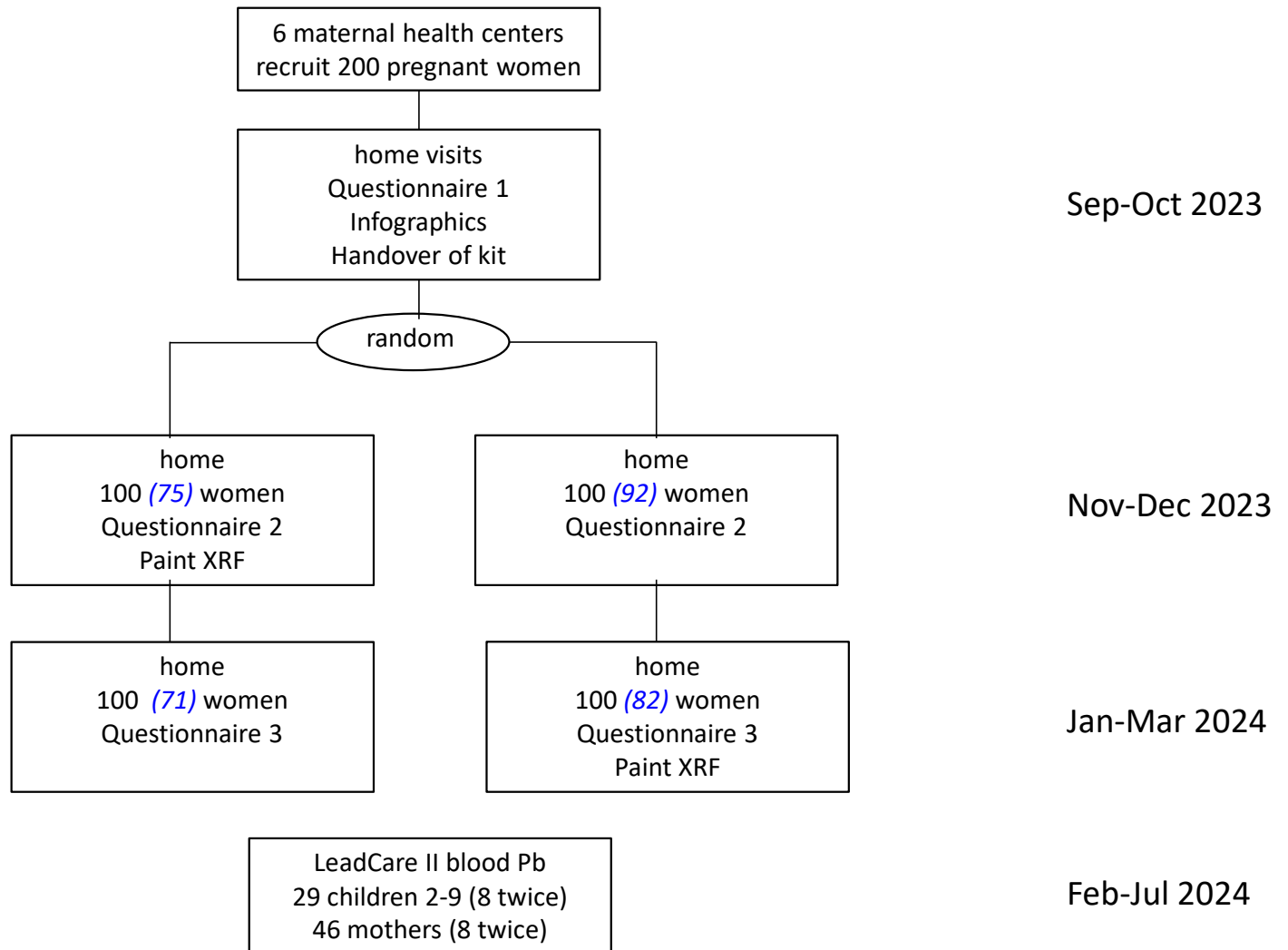
- Fluorescence-based Pb detection kit tested on variety of liquid and dry paint samples.
- High sensitivity and specificity indicated by comparison with two other methods.
- Widespread use of kit could enhance efforts to reduce child exposure to Pb in paint.
- Graphical Table of Content.

#### GRAPHICAL ABSTRACT



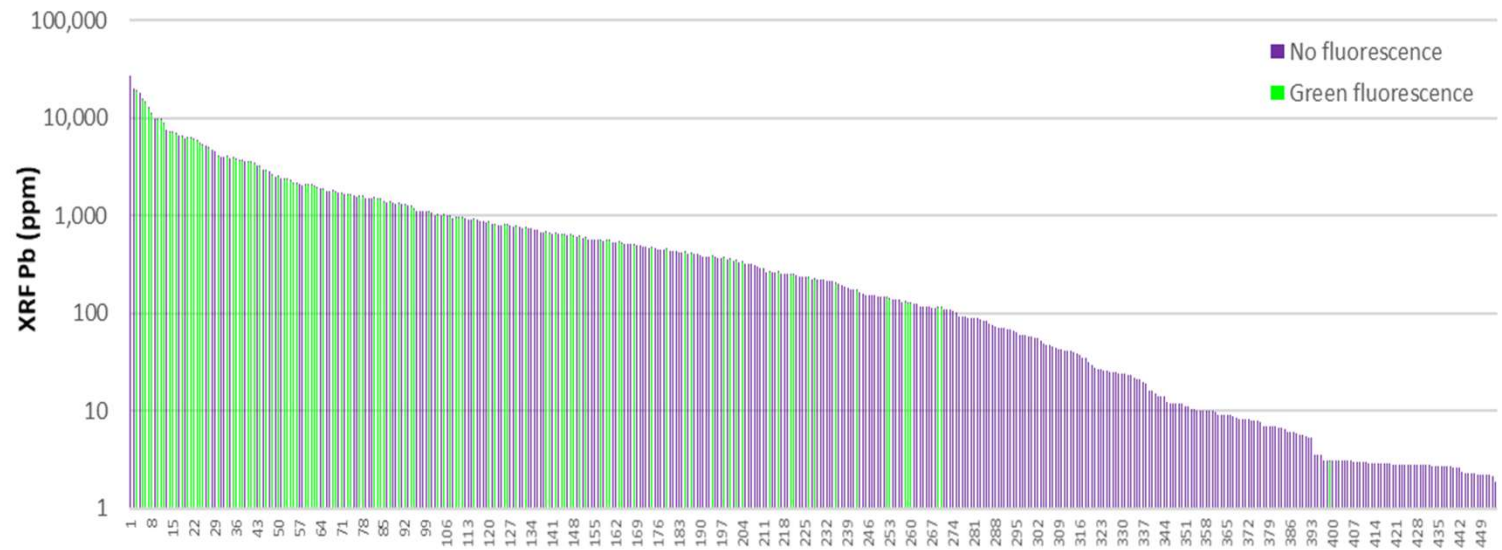
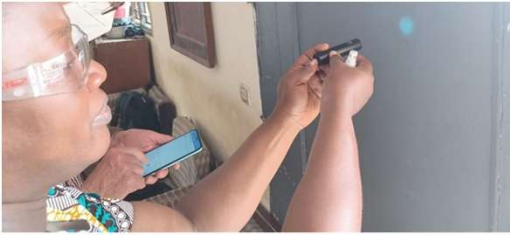
	XRF Pb	
	>500 mg kg <sup>-1</sup>	500 mg kg <sup>-1</sup>
Green fluorescence	40	2
No green fluorescence	2	32

## Design of pilot intervention, with randomized component

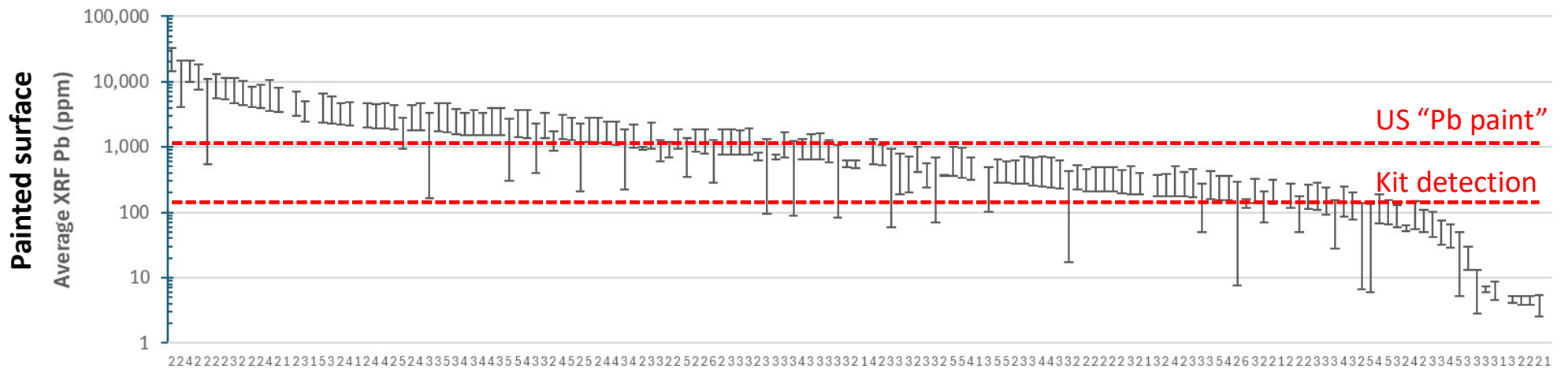
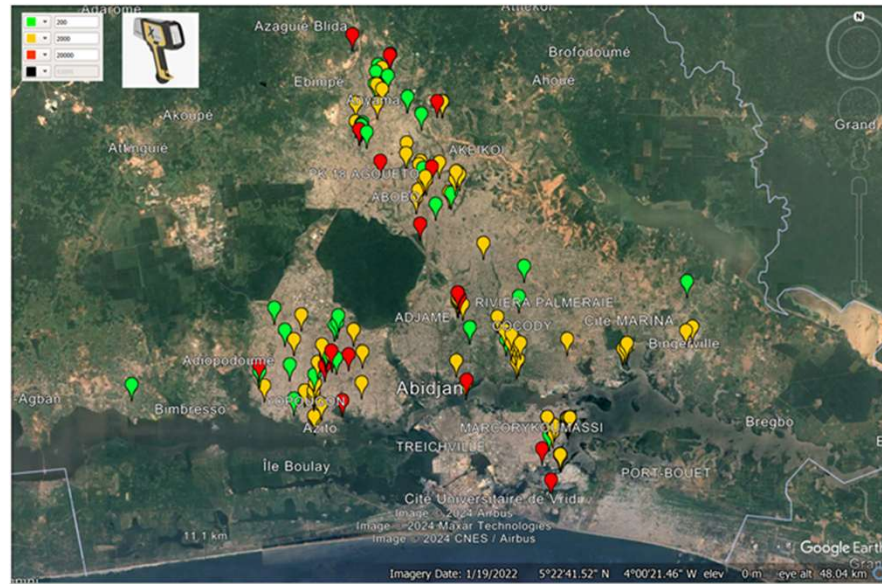


## Lumatellix kit vs. X-ray fluorescence

Surface layer vs. also underlying layers

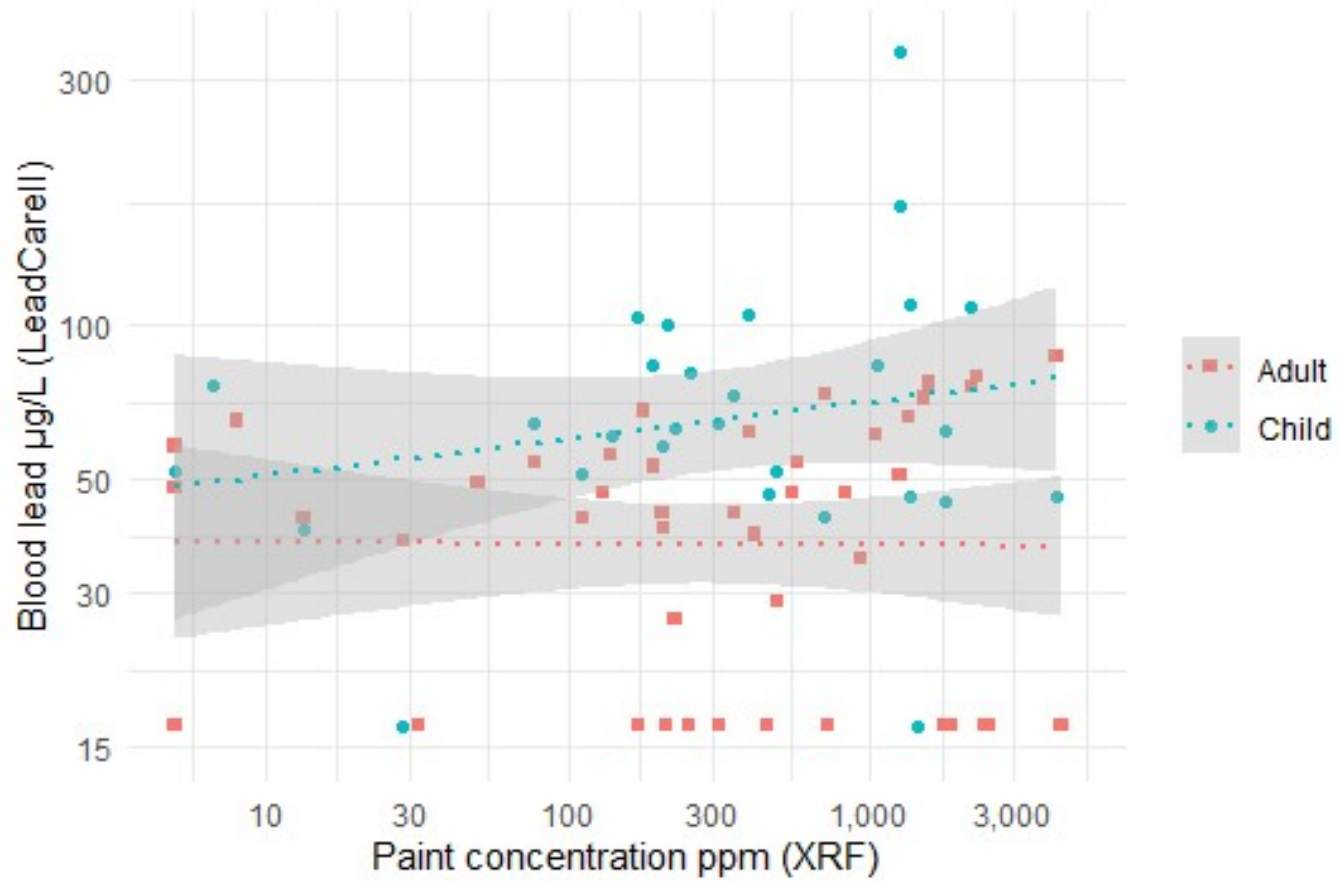


## Over half of Abidjan homes at least one painted surface >1,000 ppm Pb



**Wider range of blood-Pb for painted surface Pb >1,000 ppm for children only**

small (n), other sources?



## Impact of demonstration tests vs. XRF

Table 1: Information received about lead in paint before third visit

Information content	Percentage of Women
<b>Lead in Paint</b>	<b>69.9</b>
Demonstration Test Only	39.2
XRF Only	10.4
Both Methods	20.3
<b>No Lead in Paint</b>	<b>30.1</b>

Note: Sample of 153 women visited during the third wave (endline).

40% HHs self-tested, but usage poorly tracked

## Demonstration tests increase awareness of local risk at least as much as XRF

Table 3: Impact of test results on awareness of Pb exposure risks

	Do you think that you are exposed to lead in your daily life?			I know there is lead		
	Outcome: Yes			Outcome: Yes		
	(1)	(2)	(3)	(4)	(5)	(6)
Lead detected	0.336*** (0.0671)			0.344*** (0.0796)		
Lead: Demonstration test only		0.321*** (0.0743)	0.252*** (0.0741)		0.339*** (0.0871)	0.260*** (0.0871)
Lead: XRF only		0.267** (0.111)	0.247** (0.106)		0.166 (0.130)	0.143 (0.125)
Lead: XRF & Demonstration test		0.412*** (0.0933)	0.353*** (0.0912)		0.461*** (0.109)	0.394*** (0.107)
Lead: Self-test			0.240*** (0.0702)			0.274*** (0.0825)
Demographic controls	Yes	Yes	Yes	Yes	Yes	Yes
Surveyor dummy	Yes	Yes	Yes	Yes	Yes	Yes
Outcome mean (No Lead detected)	0.57	0.57	0.57	0.22	0.22	0.22
Observations	153	153	153	153	153	153

\*  $p < 0.1$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$ . The outcome variables are measured at endline (wave 3). Lead detected indicates whether lead was detected in the house before wave 3, either from the XRF or demonstration tests. Demographic controls include months into pregnancy, respondent's education level and age, education level of the household head, household size, number of children under 5 years old in the household, the household's wealth score, ownership or leasing status of the house, and the number of painted surfaces with different paints in the house. The wealth score is a composite index constructed using Principal Component Analysis on a set of household assets and amenities.

## Need 2<sup>nd</sup> pilot before RCT

Recruitment at vaccination centers, civil registry

Circulating video stories

Involve in testing    community health workers  
                                 high-school students

For actual RCT        blood-Pb as outcome

XRF vs. kit testing (test, health worker, student)

## The team!

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<sup>4</sup>École Nationale Supérieure de Statistique et d'Economie Appliquée (ENSEA– Côte d'Ivoire)

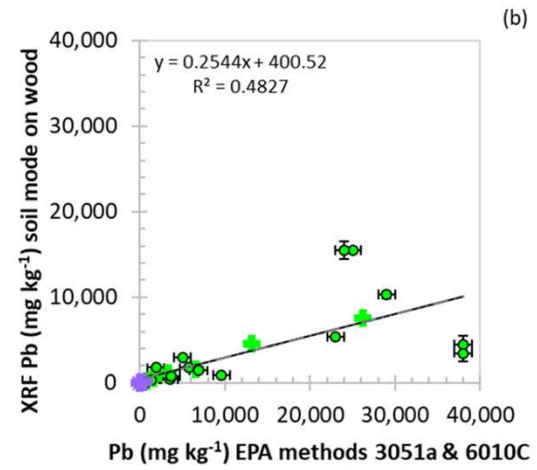
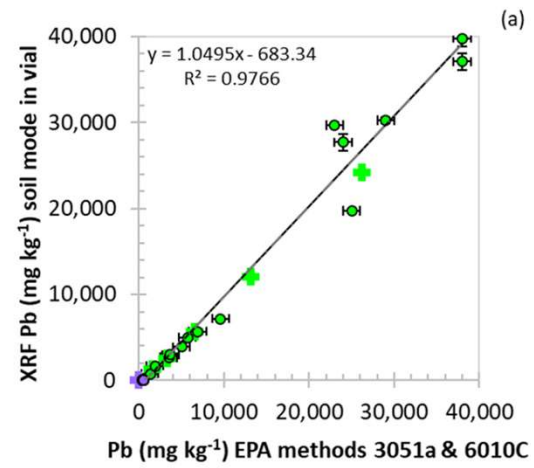
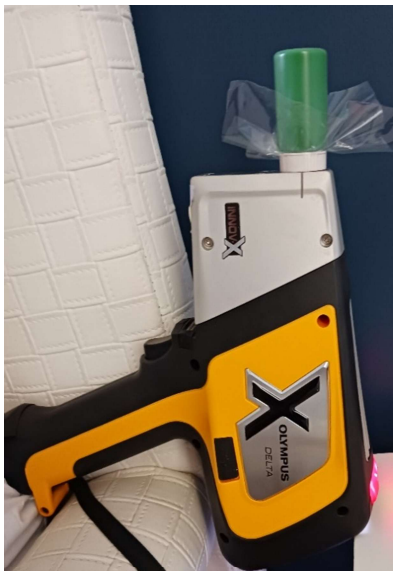
<sup>5</sup>Felix Houphouët-Boigny University (UFHB – Côte d'Ivoire),

<sup>6</sup>Laboratoire National d'Essais de Qualité de Métrologie et d'Analyse (LANEMA – Côte d'Ivoire)

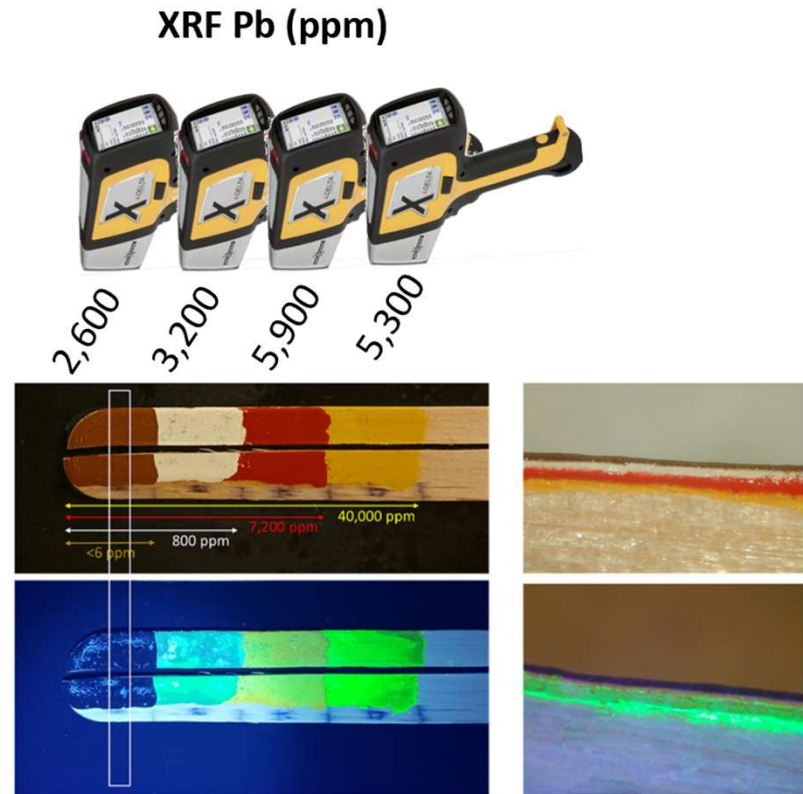
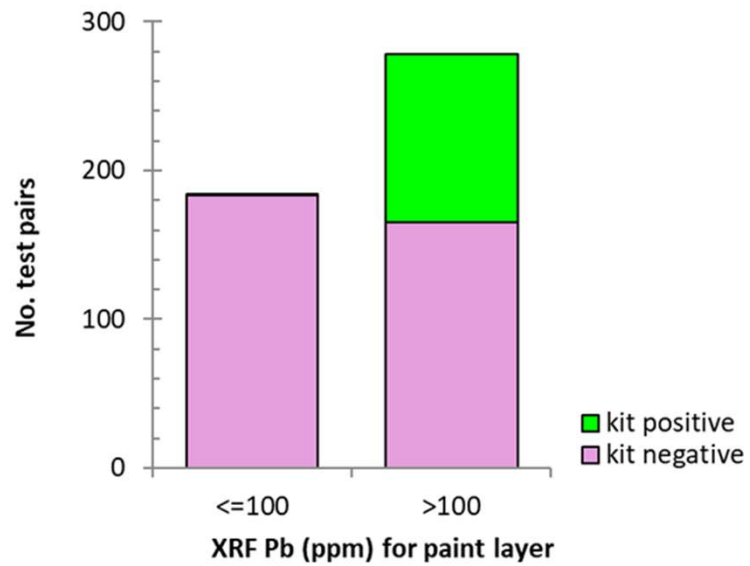
<sup>7</sup>Lamont-Doherty Earth Observatory of Columbia University (USA)

Backup slides

## X-ray fluorescence of bulk paint vs. painted surface in « soil » mode

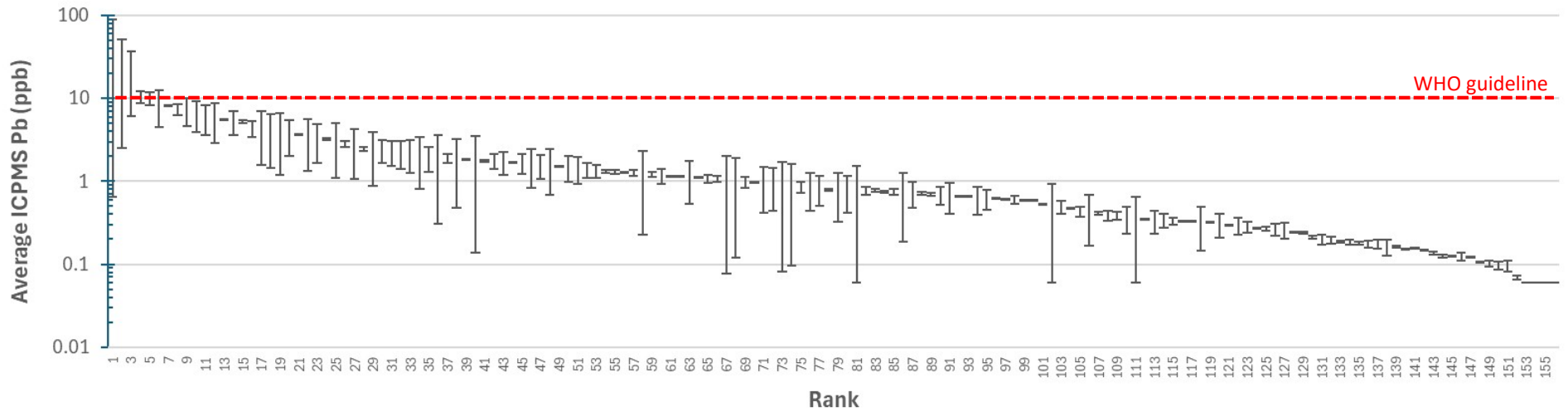


Kit responds to surface layer while XRF penetrates deeper

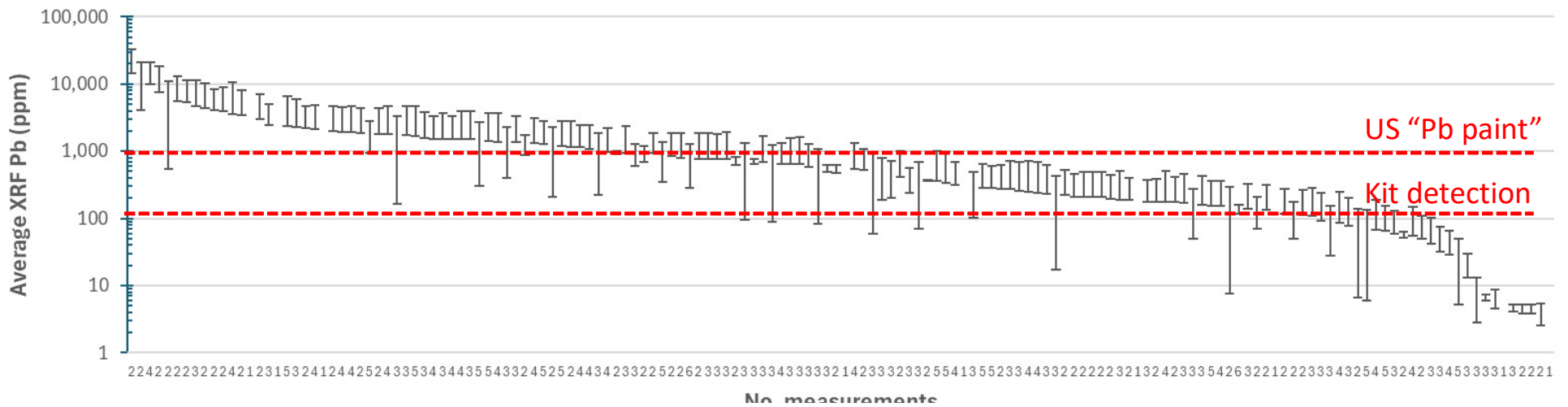


## Tap water from only a few homes high in Pb

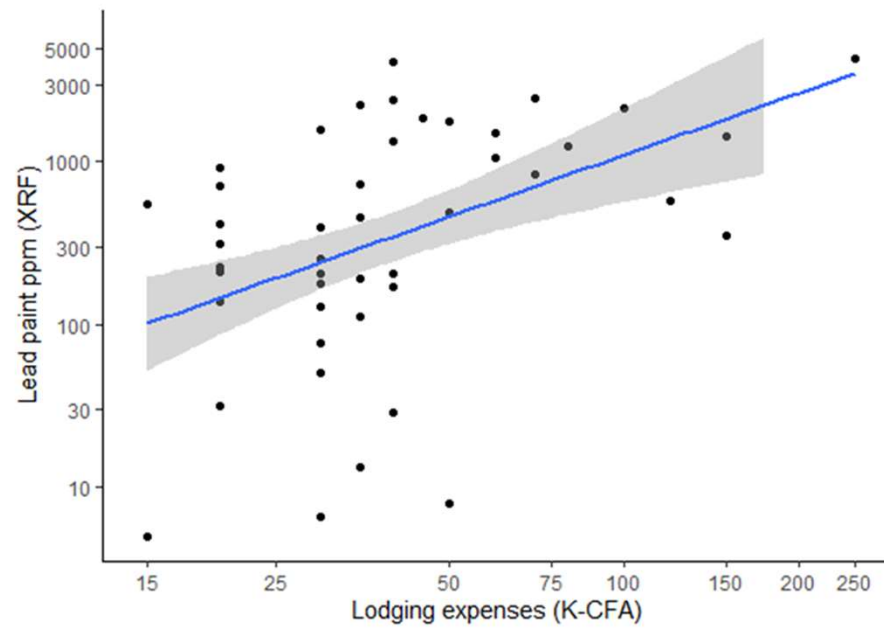
Tap water



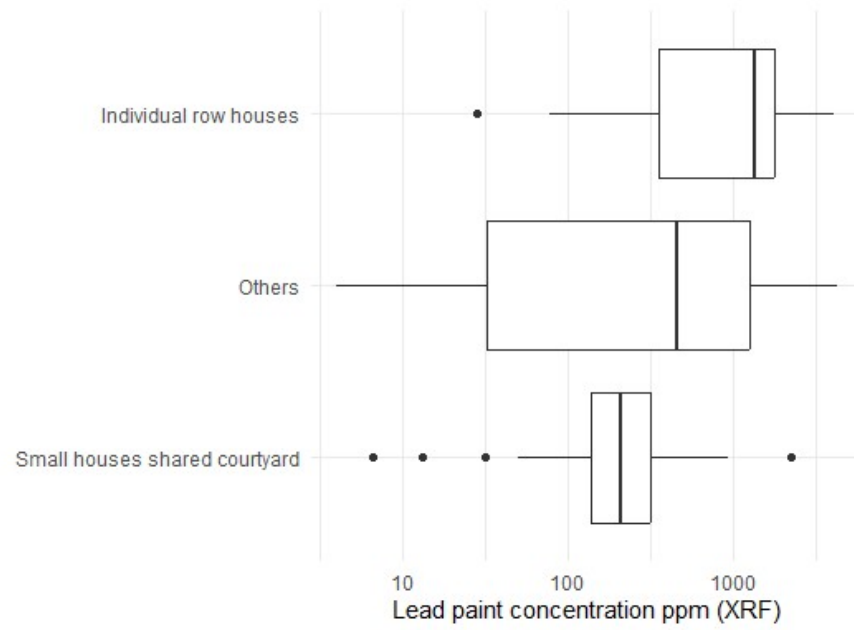
Paint



## Paint Pb and housing cost



## High Pb paint more likely in more expensive homes



## Replicated LeadCare II measurements

