

See something, say something....what could go wrong?



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See Something, Say Something (SSSS): Why is that so hard?

- Mission: *Raise awareness of human behavioral traits that interfere with SSSS*
 - *Venues: everywhere.... Including checkpoint, general surveillance, etc*
- Problems needing solutions
 - *Threats are rare*
 - *Costs of saying something may outweigh benefits*
 - *Seemingly “practical” interventions like profiling may have higher costs than benefits.*
 - *We don’t interact ideally with our AI friends.*
 - *....and we may not even see something about which we should say something*
- What to do if you have ideas, questions, or opportunities.
 - *Drop me an email: jwolfe@bwh.harvard.edu*



If you **see** something,
say something™

REPORT SUSPICIOUS
ACTIVITY TO LOCAL
AUTHORITIES.



Sounds like a
good idea

Today's topic
is the
“Positive
Predictive
Value (PPV)”
problem

Positive Predictive Value (PPV) defined.
Look for insects (toy insects)

If you see
something,
say
something



HIT
*or TRUE
POSITIVE*



FALSE *POSITIVE*





PPV = TRUE POS / (TRUE POS + FALSE POS)





PPV problem 1

The base rate or
“prevalence” problem

What is the chance that this
ambiguous thing is Bad?

Prevalence matters in search

Let's take 20 bags with guns and knives



And put them in a stack of 40 bags

50% Prevalence

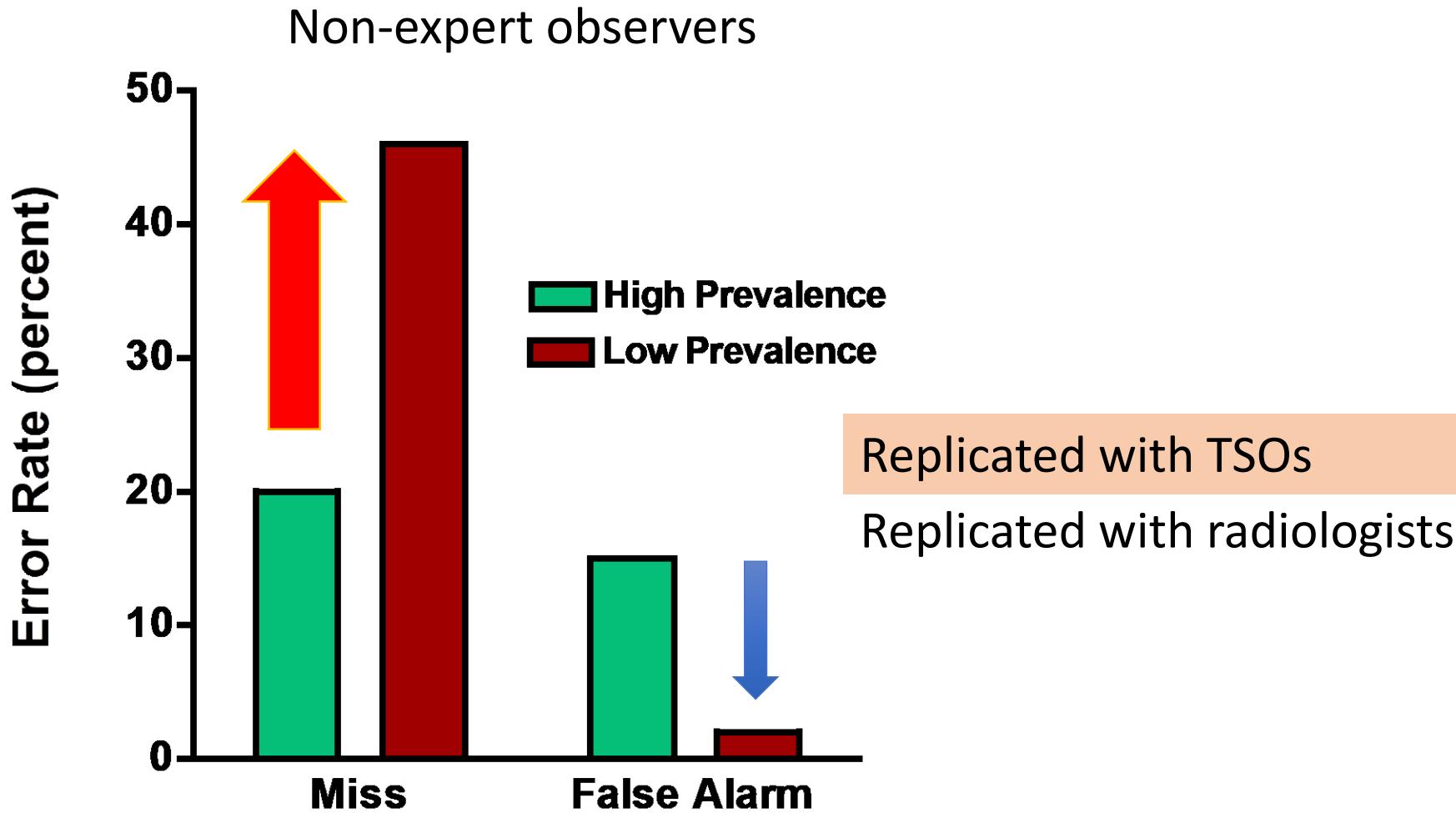


Or 1000
bags

2%
Prevalence



Miss error rates can double at low prevalence



Horowitz, T. S. (2017). Prevalence in Visual Search: From the Clinic to the Lab and Back Again. *Japanese Psychological Research*, 59(2), 65-108. doi: 10.1111/jpr.12153

REAL or FAKE?



PPV problem 2

The reward structure

What should you do if someone passes you a fake \$100 bill?

$P(\text{good outcome}) \ll P(\text{bad outcome})$

PPV problem 3:

The problem with profiling

Catch a bad wolf = k pts

Offend/upset N good wolves $(-j)$ pts)

Is $-(N^* - j) < k$



PPV problem 3:

The problem with profiling is not that people are unwilling to profile, the PPV problem is that it may do more harm than good.

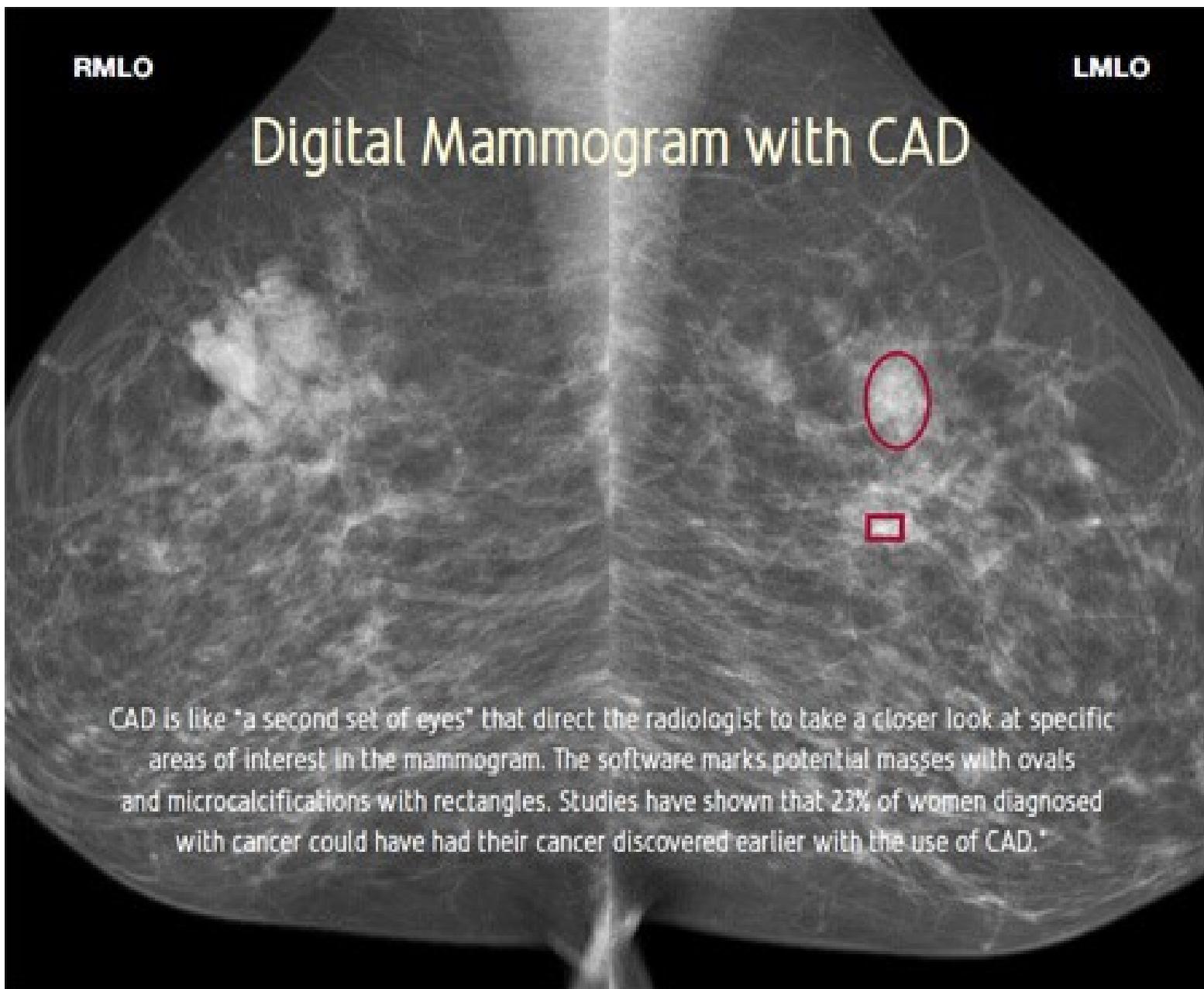
(see also Mammography)



RMLO

LMLO

Digital Mammogram with CAD



CAD is like "a second set of eyes" that direct the radiologist to take a closer look at specific areas of interest in the mammogram. The software marks potential masses with ovals and microcalcifications with rectangles. Studies have shown that 23% of women diagnosed with cancer could have had their cancer discovered earlier with the use of CAD.*

PPV problem 4:
Why AI may not
save us.

A good mammo AI

Detect 90%

False Alarm
~10%



Zoom = 1.26ROT: FL: L/R
Inc: -45 AGD: 1.38 mGy ESE: 5.61 mGy 0.3 Processed PREMIUM_VIEW
28 kV 62 mAs Mo/Rh Grid AOP/STD 15 daN 44 mm
GE MEDICAL SYSTEMS

The problem with screening

1000 cases
yield
3-4 cancers

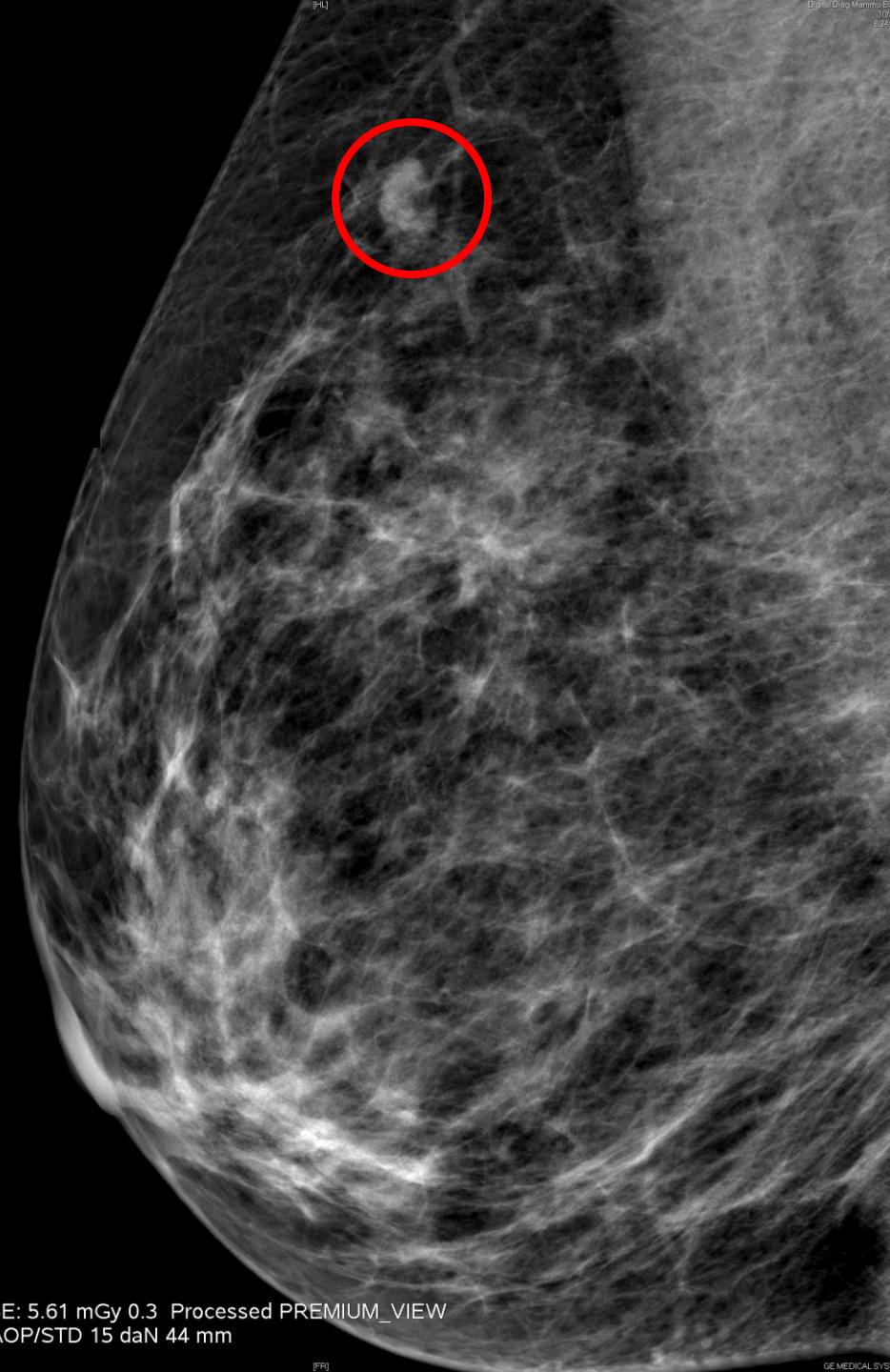


Zoom = 1.26ROT: FL: L/R
Inc: -45 AGD: 1.38 mGy ESE: 5.61 mGy 0.3 Processed PREMIUM_VIEW
28 kV 62 mAs Mo/Rh Grid AOP/STD 15 daN 44 mm
GE MEDICAL SYSTEMS

Find 3-4 cancers

Make ~100 false alarms

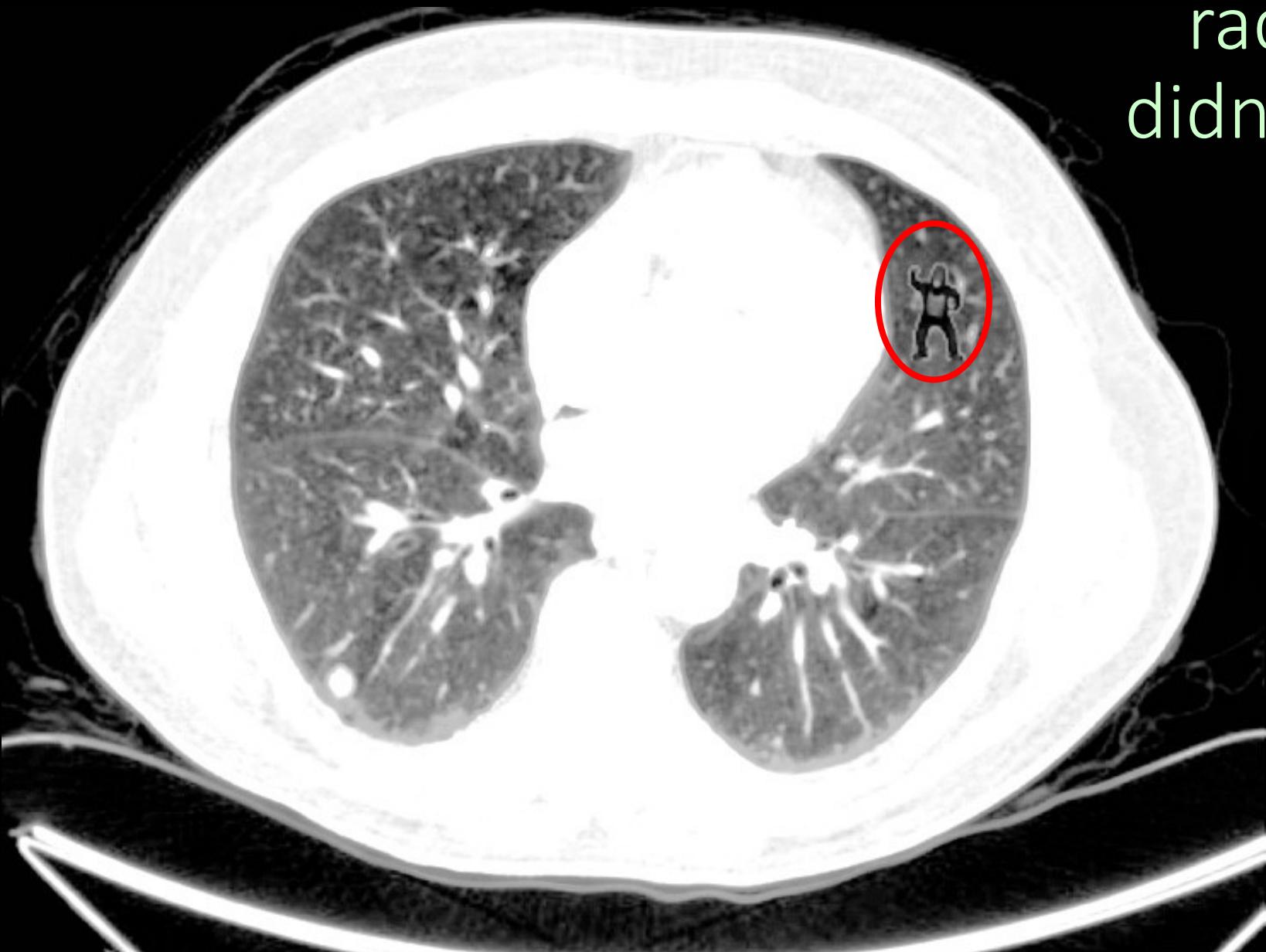
PPV = 3/103 = 3%
uh oh



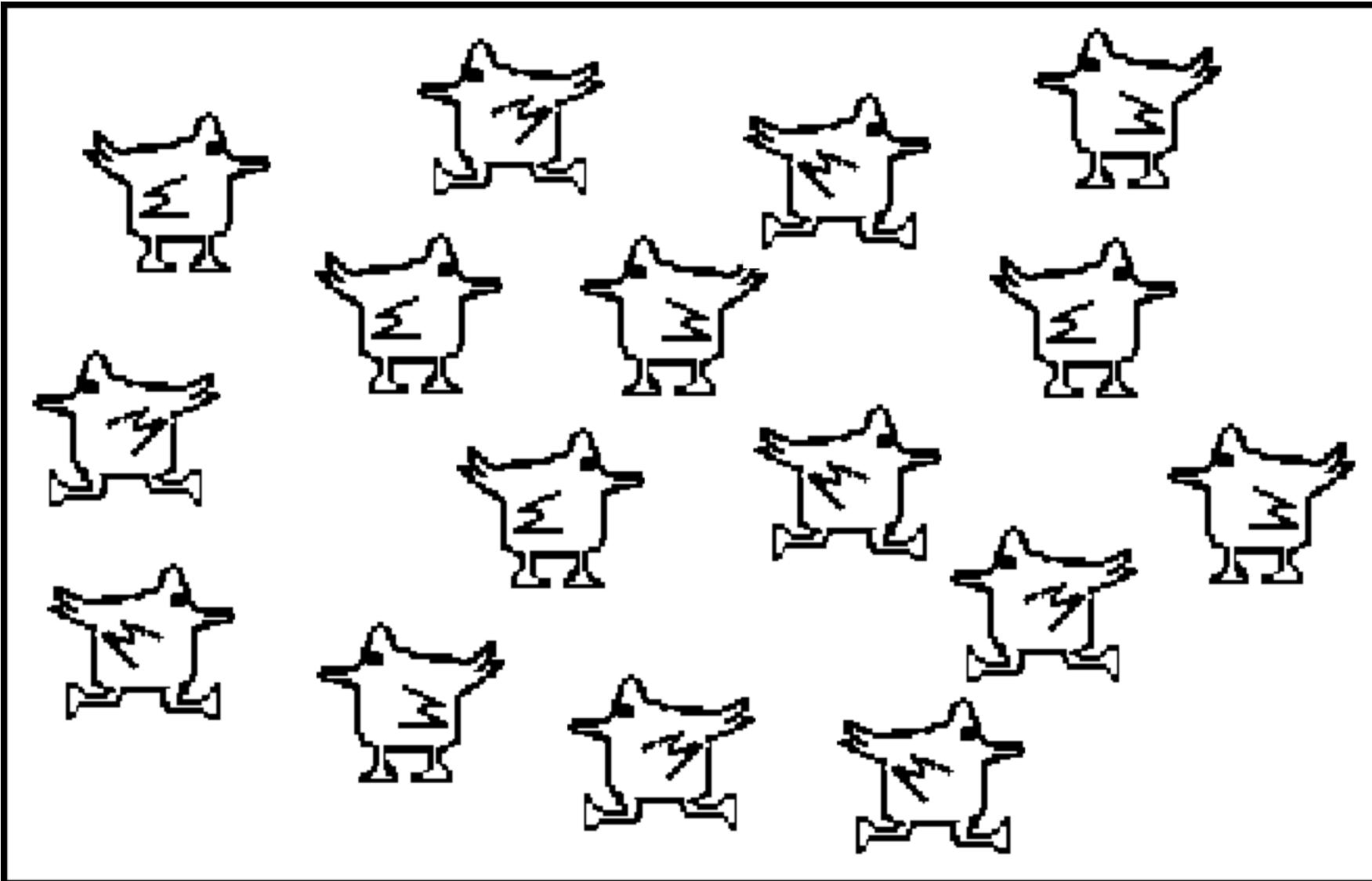
Zoom = 1.26ROT: FL: L/R
Inc: -45 AGD: 1.38 mGy ESE: 5.61 mGy 0.3 Processed PREMIUM_VIEW
28 kV 62 mAs Mo/Rh Grid AOP/STD 15 daN 44 mm
GE MEDICAL SYSTEMS

AND...we are built to miss things

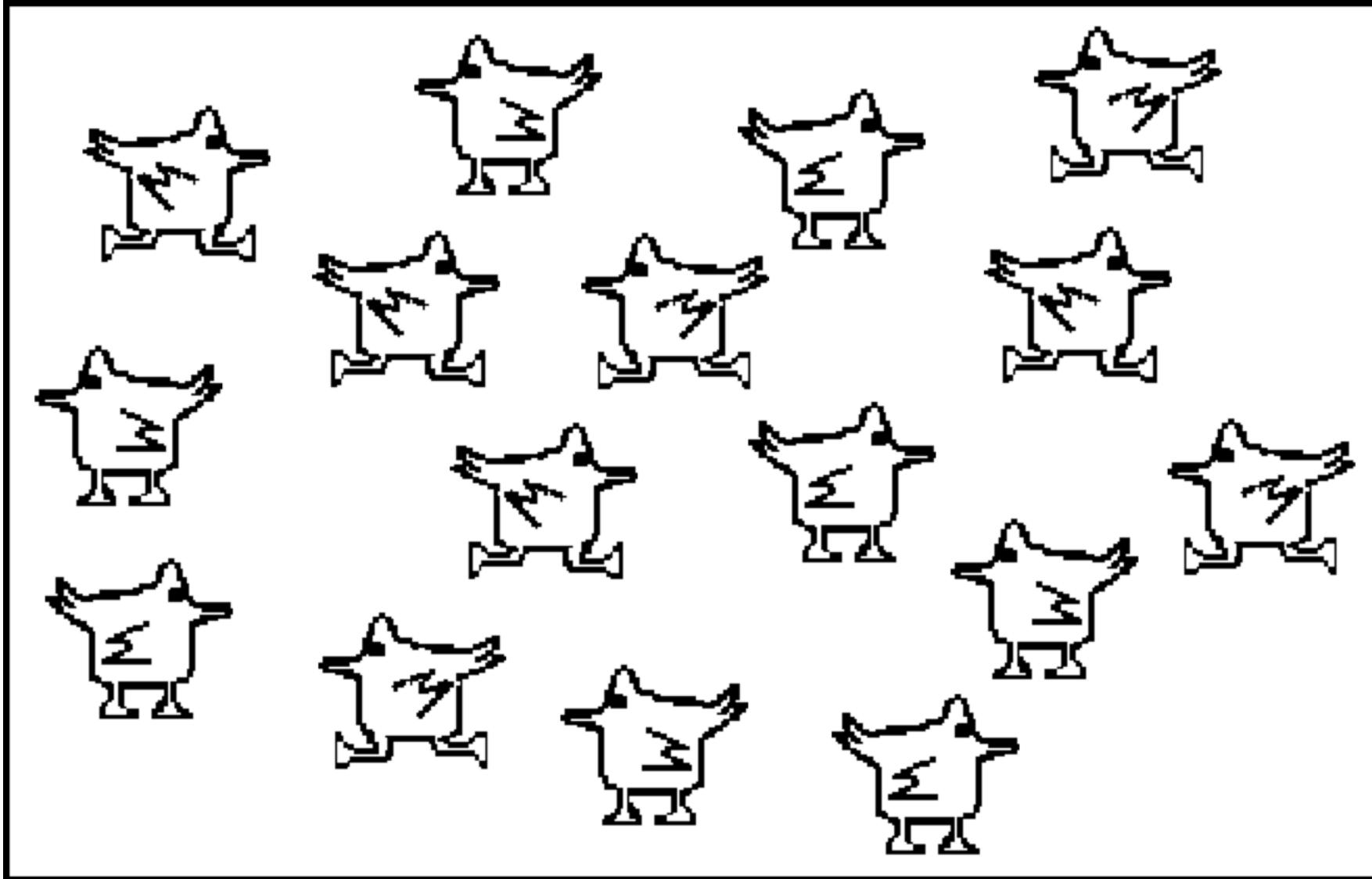
20 of 24
radiologists
didn't report it



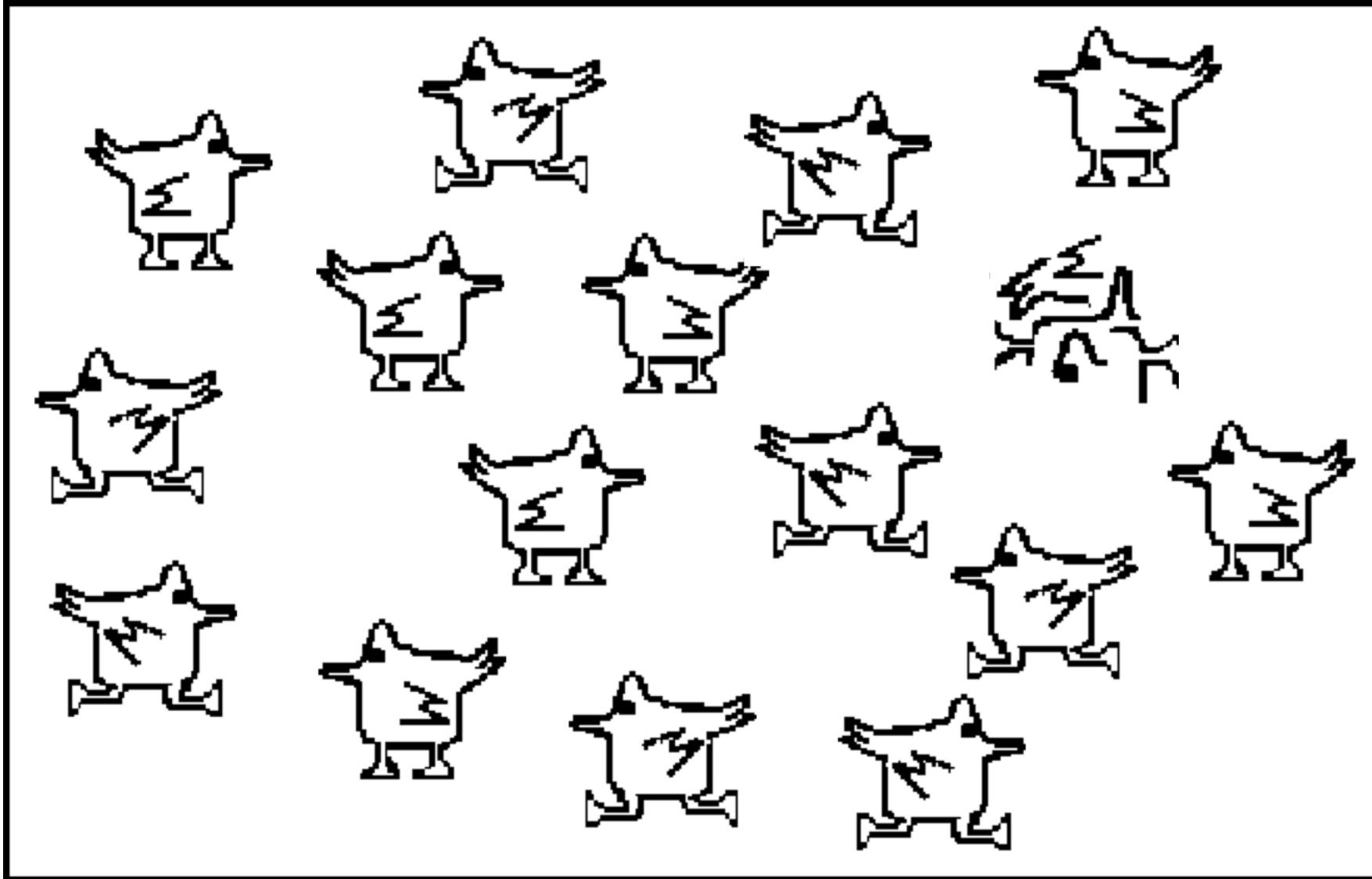
You miss things you would not expect to miss



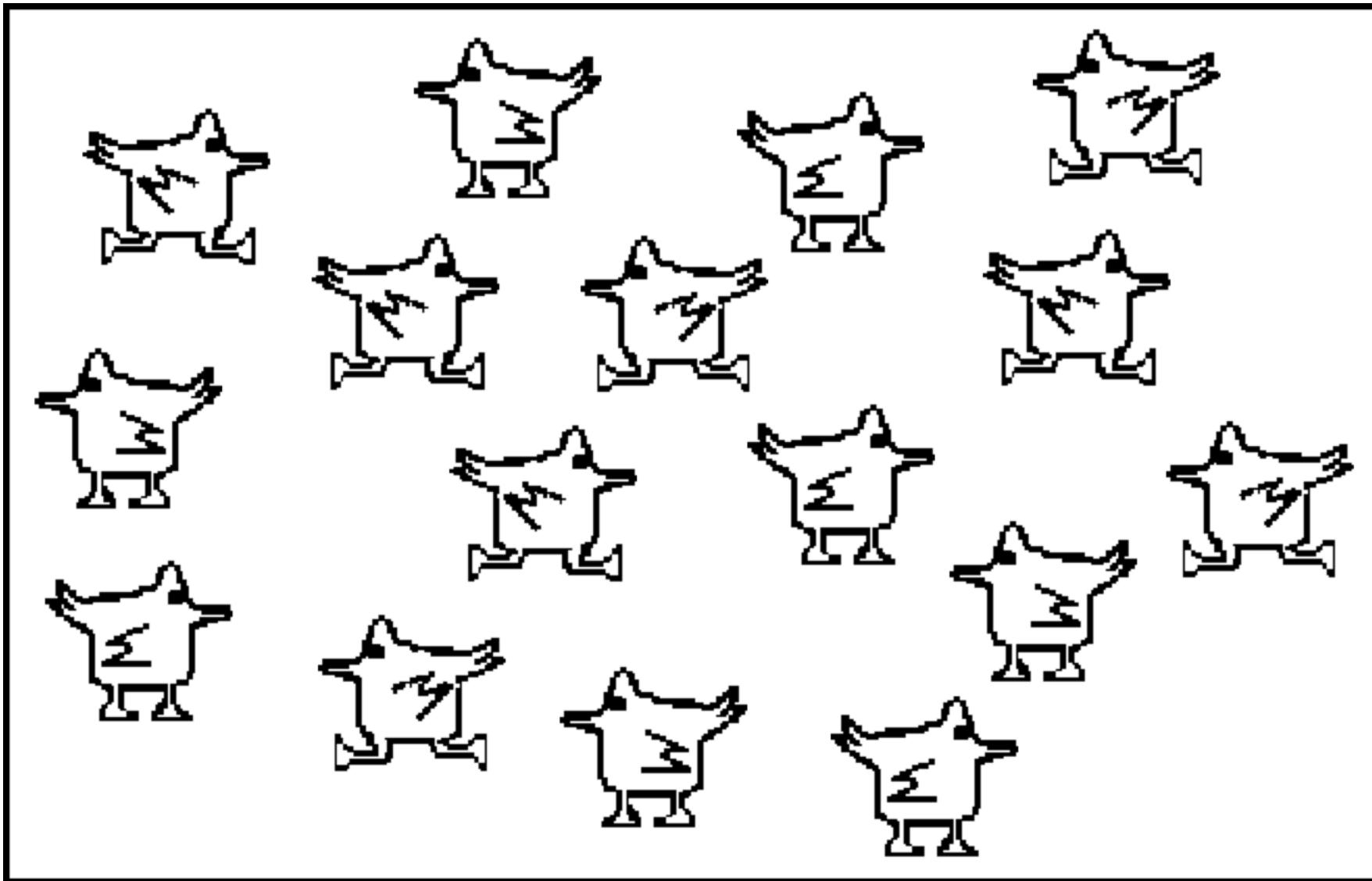
You miss things you would not expect to miss



You miss things you would not expect to miss



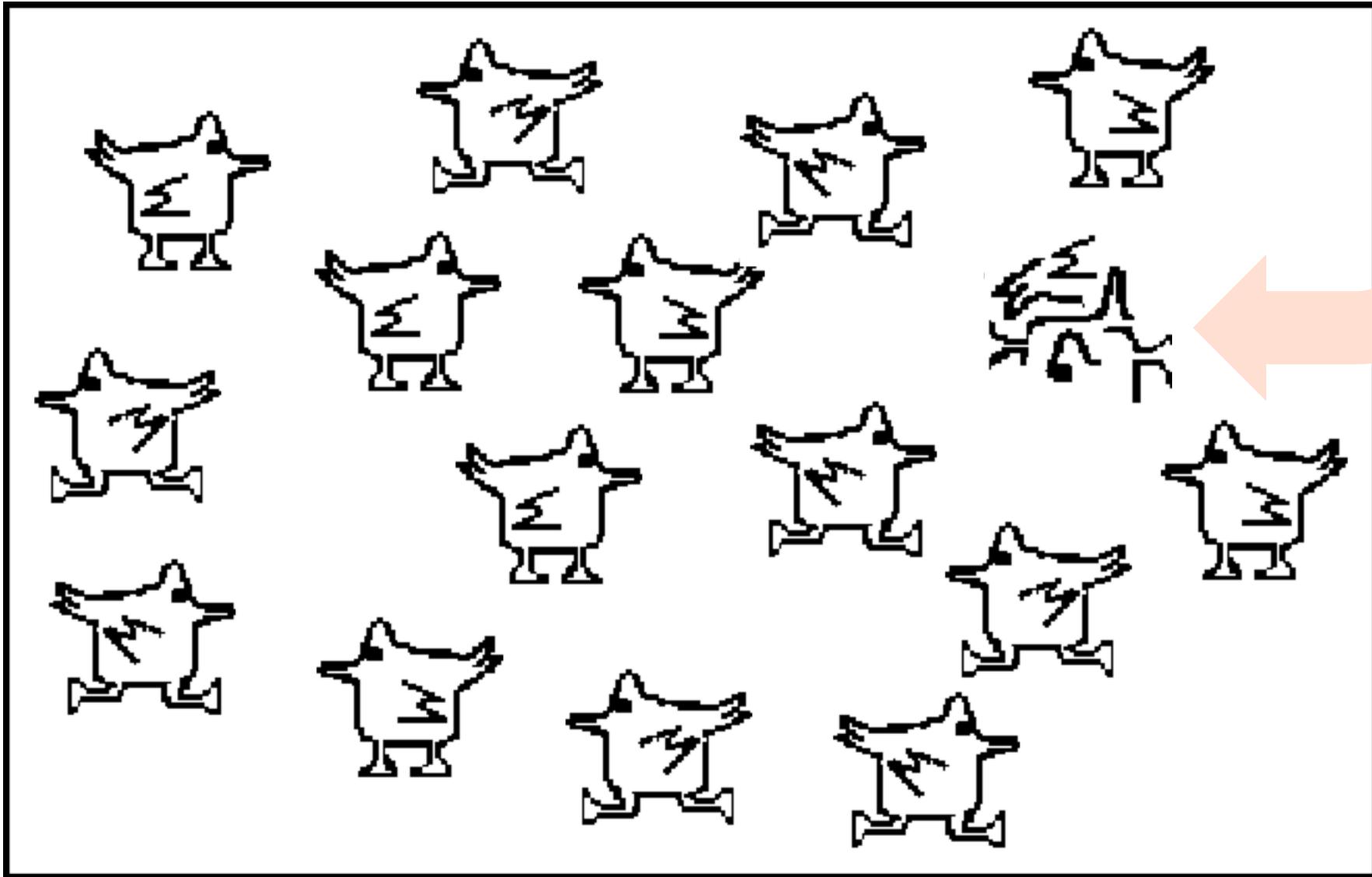
You miss things you would not expect to miss



Did you happen to select the
destroyed chicken?

If not, you missed it

You miss things you would not expect to miss



In sum.....



The structure of your world confronts you with multiple PPV / base rate problems.



The structure of your mind creates “normal blindness”.



Knowing your weaknesses is a good place to start

