



# COVID-19 PANDEMIC: PREVENTING & MANAGING THE HEALTH IMPACT ON KIDS

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**Disclaimer:** Information on COVID-19 is changing rapidly and much of the research is preliminary. Assessment and management protocols are suggestions only; they do not take the place of clinical judgement. Please check with your own health authorities and local medical health officers as policies and support for the suggested approaches to patient care may vary between regions.

This summary was prepared by Dr. Birinder Narang and not by the speakers.

## Webinar Summary

### Epidemiology Update – Dr. Alex Choi

- While case counts are becoming less relevant as we progress, our epidemic curve now demonstrates that we are in the 5<sup>th</sup> wave
- Pandemic goals have always been to:
  - Minimize morbidity and mortality
  - Maintain health system capacity
  - Minimize societal and health harms of both the virus and the interventions
- Early on in the pandemic, the goal was to reduce cases as much as possible until vaccines became available
- In the absence of information, schools closed out of an abundance of caution
  - There were fears that disease could be more severe in children, or that schools could amplify transmission
  - By Spring 2020, it became clearer that children commonly experienced mild disease, and the body of evidence suggested that schools did not amplify transmission, particularly when preventive measures were put into place
- Most schools reopened in Fall 2020 with COVID-19 safety plans in place

- Following vaccination, we saw a shift in severe disease and deaths from older age groups to unvaccinated individuals
- We also saw increasingly compelling evidence of unintended consequences from pandemic restrictions, such as ongoing overdose deaths, reports of worsening mental health, loss of social connections and worse educational outcomes
- Our approach must be balanced
- In Fall 2021, high vaccination coverage in some parts of the province (e.g. the Lower Mainland) allowed us to begin to lift pandemic restrictions, even though measures were still required in areas with lower vaccine coverage (e.g. North, Interior)
- During the 5<sup>th</sup> wave, it became increasingly clear that COVID-19 will continue to circulate in our community and that everyone will be exposed
  - The goal is still to reduce exposure and transmission to preserve health system capacity, especially as we continue to learn about the severity of the Omicron strain
- Over the holidays, we still needed to reduce transmission to preserve health system capacity, so we focused on where the majority of transmission has always occurred – households and social networks
- However, while increased community transmission and increased transmissibility from Omicron are likely to result in more introductions of COVID-19 in K-12 classrooms and more in-school transmission that we've seen in previous waves, this needs to be taken in the context of the levels of community transmission
- As we've seen throughout the pandemic, in-school transmission continues to constitute a low proportion of cases given that community transmission is also being affected by more frequent exposures and increased transmissibility

### **COVID-19 & Schools**

- Studies on COVID-19 transmission in BC have contributed to our understanding, along with ongoing research being done around the world
- One of the first studies done in BC used contact tracing data
  - From September 10 to December 18, 2020 8,793 cases were reported in the VCH region (73 per 10,000 people)
  - Out of these, 699 were K-12 students or staff working in or attending school in-person (55 per 10,000 people)
  - Over half of the 699 student and staff cases were due to household transmission
  - 26 students/staff members went on to transmit to at least one other person at school, resulting in 55 secondary cases and 10 tertiary cases (family member, friends, etc.)
  - There were 0 deaths
  - Median cluster size was 2.5 meaning that when a case went on to transmit in the school setting (and in over 90% of cases they didn't) they transmitted the virus to 1 or 2 other people

- Interestingly incidence in community did not appear to increase with school start as one might expect if schools amplified community transmission
  - Findings were similar to what we saw around the world
- This does not imply there is no transmission in schools but rather that cases due to in-school transmission constitute a very low proportion of overall COVID-19 cases in the community
- Given that the first study did not address asymptomatic transmission, the study team went on to conduct an asymptomatic viral testing study, looking for asymptomatic transmission from April to June 2021
  - 69 students and staff members participated in the study
  - 392 close contacts were identified, isolated and offered asymptomatic testing at 3 different time points: at the time of notification, 7 days post-exposure and 14 days post-exposure
  - We already knew from the international literature that if you were in the same class as a person with COVID-19 your risk of contracting COVID-19 seemed to be between 1-10/1000, but we thought that this could be an underestimate
    - It could be that while classmates are not at high risk those who have closer contact might be (e.g. sit next to cases or play with them at recess)
  - So we looked at those in the classroom that had the closest contact with cases. We found that even your best friend or deskmate have a low risk of acquiring COVID-19 in the school setting (around 1.3%)
  - The study was conducted in a time period when Alpha, Gamma, and Delta were circulating. If Omicron is 10x more transmissible, we are looking at relatively low absolute risk given that increased transmissibility will also affect community transmission
- Though we can never guarantee zero risk of transmission, we are seeing low risk in schools
- Recognizing that PCR testing has its limitations, we then did a seroprevalence for staff members:
  - 21.5% staff members of identified as being in close contact with COVID-19 cases in school; only 1.4% had evidence of prior infection
  - Adjusted seroprevalence was compared to the general population and was found to be similar at 2.3%
- Given that our original contact tracing study was prior to the circulation of Variants of Concern (VOC), we did another study with contact tracing data:
  - We did another series of chart reviews and another contact tracing study using VOC data
  - Between January 1<sup>st</sup> and July 13<sup>th</sup>, we had 1,339 VOC cases among students and staff members; 85 went on to transmit to at least one other case in school, resulting in 111 secondary cases.
  - Over 90% of cases did not transmit to anyone in the school environment (median cluster size of 2)

- On average, if transmission did occur, 1 other person was infected
- During Sept 2021 – Jan 2022, schools were becoming communities again, and where schools double as social networks we do see transmission occurring. In a lot of ways, we were glad that school and communities were coming back together – we know that social isolation and decreased social connection have had a huge impact on kids. But at the same time this does have implications for COVID-19 transmission
  - There are 120,000 school aged children & staff in VCH Region
  - 1,194 school age children or staff were diagnosed with COVID-19
  - 294 K-12 schools had cases of COVID-19
  - We found 42 clusters with more than 2 cases (median cluster size was 3)
  - School transmission continued to represent 1% of all community cases
- Studies around the world have been very consistent
- We are trying to put in appropriate preventive measures while maintaining a balanced approach
- A close to normal school experience is an important part of pandemic recovery, and evidence is mounting that this pandemic has had dire unintended consequences

## Children & COVID-19: Focus on vaccination – Dr. Laura Sauvé

### COVID-19 Vaccines

- Vaccines are both are effective and safe
  - Effectiveness against Delta and previous variants:
    - Highly effective at protecting against MIS-C
  - Effectiveness against Omicron:
    - Vaccines provide excellent protection against severe disease
    - In youth, vaccines also prevent even the small number of severe outcomes
  - The measured vaccine efficacy against disease in adults is low after 2 doses and moderate after 3 doses
- Surveillance is ongoing (as always) including IMPACT
  - In ages 12-18:
    - Mostly mild vaccine reactions
    - In very rare cases, myo/pericarditis is seen in about 2-3 of every 100,000 doses – mostly after dose 2 and more common with high doses of Moderna
  - In ages 5-12:
    - Mostly mild vaccine reactions
    - Also very rare, Myo/pericarditis has been seen in 11 cases after 8 million vaccines (likely lower than 12-18)
- Does COVID-19 prevent MIS-C?

- MIS-C affects 0.5-31% of children diagnosed with SARS-COV-2 infection
- The estimated vaccine effectiveness of 2 doses of Pfizer vaccine against MIS-C in 12-18 year-olds was 91% (95% CI = 78-97%)
- Amongst critically ill MIS-C case patients requiring life support, all were unvaccinated
- Who is at risk for more severe disease?
  - Even higher-risk children rarely have severe disease at this point in the pandemic; about 505 of hospitalizations with COVID-19 are for reasons other than COVID-19
  - Risk factors:
    - Multiple comorbidities
    - Chronic cardiac or lung disease
    - Obesity
    - Neurological disorders
    - Anemia/hemoglobinopathies
    - Immunodeficiency

### **Vaccine Hesitancy: Challenging and Time-Consuming Conversations**

- Key elements:
  - Acknowledge the parent's concern & build trust (especially for families who have experienced racism, trauma, colonialism, etc.)
  - Focus on the right risks
    - For a vaccine to be approved, benefits must outweigh the risk
  - Describe the trustworthiness of Canada's immunization system
  - Make a strong recommendation (this makes a big difference)
- The Family Immunization Clinic at BCCH does vaccine hesitancy consultations (including by telehealth)
- Focus more on the individual benefits, instead of community benefits which can worsen hesitancy

### **Myo/pericarditis: What to do with vaccination afterwards?**

- Defer further mRNA COVID-19 vaccines (if confirmed myo-pericarditis within 6 weeks of vaccine)
- If patients had symptoms of pericarditis but normal workup (or no workup), refer the vaccine after 90 days
- If a patient chooses to get an additional dose after myocarditis and has weighed the risks and benefits), offer the Pfizer BioNTech 30 mcg vaccine (instead of Moderna) due to the side effect profile
- Consider referring patients to the BCCH Family Immunization Clinic's Special Immunization Clinic for family counselling and up-to-date recommendations

- Note: Myocarditis from SARS-COV-2 infection was seen in 450 cases per million infections

#### **Vaccine Interval: 21 days or 8 weeks?**

- Earlier interval leads to earlier protection (although this likely will not change the omicron wave)
- Later interval leads to lower risk for myocarditis (especially in youth aged 12-18)
- Better and more durable protection is well established in adults
  - Data is still emerging for children and youth

#### **Vaccines and Pregnant Women**

- Evidence from other respiratory pathogens (i.e. influenza/pertussis) suggests that infants get less disease and less severe disease in the first 6 months of life when mothers are vaccinated in the 3<sup>rd</sup> trimester
- Vaccinating families will help protect the newborn as well as children too young to be vaccinated

## **Children & COVID-19: Clinical Pearls – Dr. Ran Goldman**

### **COVID-19 in Children**

- Anyone can get sick from it, even infants as young as 9-days-old, as seen recently
  - Age is not a factor anymore
- Respiratory manifestations and fever, like other viruses, can look worse than it is in younger populations due to smaller airways
- No rapid deterioration is being observed when they have the viral illness
- Part of the rising rate is that we are testing more
- Symptoms include fever, rhinorrhea, sore throat, cough, fatigue, diarrhea and vomiting
  - With symptoms of fever and hypoxemia, we will look at other viral pathogens as well
- Investigations:
  - There is less value in blood work and CXR, as pneumonia is rare, and blood tests have had no impact on management
  - The rule of thumb is to order them on children that require admission, which continues to be rare
- Neonates:
  - Every child with fever needs to have a full investigation, including full septic workup (i.e. lab work, urinalysis, lumbar puncture)
  - It is important to admit and wait for cultures at 3 days
- Mental Health:
  - Isolation has had an impact on mental health and anxiety, especially on adolescents

- Lack of social skills and reliance of interaction through computers have taken a toll

### **Multi-Inflammatory Syndrome (MIS-C)**

- MIS-C is a febrile syndrome characterized by systemic hyperinflammation, persistent fever and multi system organ dysfunction
- Deterioration can be rapid and thus needs to be identified early on
- 1 to 2 thirds of cases would be able to identify they had COVID (i.e. if asymptomatic or presenting long after infection)
- 5000 students have been reported to have MIS-C in the States whereas there has been about 269 in Canada as of October 2021
- Symptoms include persistent fever, abdominal pain, vomiting/diarrhea, mucocutaneous changes in skin and mucous membranes conjunctivitis, rash, headaches and potential cardiac dysfunction
- Cases have been reported in those as young as 1 week of age to 18 years age
  - The median is ~ 6 years of age
- 99% of children need admission
  - 1/3 will require intensive care unit support
  - If diagnosed early and on time, they will recover
- No deaths have been reported in Canada

### **Myocarditis/Pericarditis**

- We are seeing a lot of parents and children presenting with chest pain 1-2 days post-vaccination. Several hundred cases of true pericarditis have been documented.
- Clinical presentation is mild and most do not need to stay in hospital
  - Instances of admission are rare and usually in boys at age 16 and older
- Occurrences are usually 48 hours after receiving the 2<sup>nd</sup> dose
- Symptoms include chest pain, shortness of breath and palpitations
- We recommend troponin to make sure levels are documented
- If symptoms are elevated, see a cardiologist and consider cardiac ultrasounds and echocardiograms

## **COVID-19: In Person vs Distance Learning – Dr. Tom Warshawski**

### **Impact of COVID-19 on Children and Youth’s Mental Health**

- There are multiple mental health stressors:
  - School closures lead to reduced interactions and social isolation

- Social distancing further isolates children
- Family stress
- Exposure stress
- A major COVID-19 related disruption in the lives of children and youth has been the pivot to online learning
- In-person schooling provides key protective factors for children’s mental health
  - Social interactions, structured routines, physical activity + societal oversight are all important
- Global increases:
  - Depression: global increase in depression prevalence from 12.9% to 25.2%
  - Anxiety: global increase in anxiety prevalence from 11.6% to 20.5%
- Effects on Canadian Children
  - A study was conducted in February 2021
    - 1013 parents & 385 children and youth aged 10-18 participated
  - Cross-sectional data was collected regarding change in 6 mental health domains:
    - Depression was worse in 35-46%, better in 8.8-19.6%
    - Anxiety was worse in 37.8-46.5%, better in 3.8-14%
      - Children with ASD tended to do better overall (ASD – Autism Spectrum Disorder)
    - Irritability was worse in 44.6-53.6%, better in 4.1-10.9%
    - Attention was worse in 45.6-53.3%, better in 4.4-11%
    - Hyperactivity was worse in 30-48.8%, better in 2.2-8.2%
    - OCD was worse in 19.7-22.6%, better in 3.9-41%
    - 67-70% had deterioration in at least one domain.
    - Those with pre-existing mental health conditions did worse
  - Mental health changes were analyzed for association with pandemic risk factors: COVID-19 exposure, compliance, economic concerns and social isolation
  - For school-aged children, in all mental health domains, stress from social isolation was the strongest risk factor for mental health deterioration
  - Less classroom time was the primary driver of social isolation and triggered loss of structure and an increase in screen time
  - Another study was conducted on screen use and mental health symptoms in Canadian children and youth during the COVID-19 Pandemic:
    - This was a longitudinal study looking at screen times <1 hour to > 8 hours
    - TV/digital media, video games, video chatting and electronic learning were all considered
    - Parents reported higher outcomes of depression, anxiety, irritability, inattention and conduct problems



- Higher TV/digital media was associated with depression, anxiety, irritability and inattention
- No link was found between TV/digital media and depression in children with ASD
- Increasing video game time was correlated with depression, irritability, inattention and hyperactivity
- Electronic learning was associated with depression and anxiety
- No protective association was found with video chatting
- Directionality can't be concluded but media type is associated with distinct mental health symptoms (i.e. video games and hyperactivity)
- Subjective clinical impression of worsening mental health in children and youth (e.g. patients growing more distressed, mental health clinicians with growing waitlists, etc.)
  - Parents, children and youth report deteriorating mental health
  - Child and youth suicide attempts have significantly increased
  - Children and youth substance use admissions have increased
  - BCCH has had a 50% increase in admissions for children with eating disorders

### **Academic impact of the pivot to distance learning**

- Teachers:
  - Most were ill-prepared for the transition and inexperienced in virtual teaching/learning
  - Instruction time was significantly reduced
- Family vulnerability:
  - Many families are ill-equipped to instruct, motivate and engage learners
    - 60% of families had both caregivers work during day
    - 10% of families had at least one parent struggle with mental health
    - 15% of families had at least one parent with low literacy
    - 13% of families are single-parent families
    - Up to 30% of BC families have no access to internet-enabled devices
    - 12% of Canadian homes are without internet (economic gradient)
    - 6% of parents do not speak English at home
- Student vulnerability:
  - Many students are ill-suited for online learning
  - 5-9% of students with ADHD are significantly challenged by virtual learning with 78% spending <10 hours per week on schoolwork (vs. 27 hours/week in class)
  - 10-20% of students with learning disabilities (e.g. dyscalculia and dyslexia) and/or intellectual disabilities lose access to specialized programs
- Outcomes

- 75% of BC parents report virtual instructions have impaired their child’s learning (BCCDC, Sept 2020)
- Canadian data is sparse with mixed findings:
  - Increased failure rates
  - Lower report card scores
  - Lower scores on standardized tests
  - Higher teacher assigned grades
- Learning loss does occur, most likely in the vulnerable who are also less able to recoup loss, potentially widening learning disparities
- Summary
  - Most children and youth are at relatively low risk of serious illness from COVID-19
  - School closures pose significant threats to the mental health of many, but not all, child and youth
  - Significant proportion of students, especially the academically vulnerable, suffer learning loss with virtual learning
  - Vulnerable students may not recoup lost academic ground
  - School closures should be a last resort

## Question & Answers

**Q: During the January 10<sup>th</sup> townhall, Dr. Henry said that children who are symptomatic with COVID-19 can now return once their symptoms resolved. I thought that BCCDC guidelines advised unvaccinated or partially positive cases need to isolate for 10 days. Could you please clarify?**

**A:** The reason this is being changed right now is due to the shift to the endemic stage. Earlier we were trying to go through conservative measures with isolation, i.e. isolating for 10 days. This started to change in other jurisdictions before us. We are now moving to isolate only when the virus is found to be most infectious and most likely to transmit, and that is usually around 5 days. Right now, there is a difference between the vaccinated and unvaccinated groups, though it may be advised as 5 days for both.

Testing is seriously strained in many places of the province and is being limited in order to encourage people to test only where it would really change management (i.e. based on risk, such as those who would benefit from monoclonal antibodies, or those in hospital). If you are not getting tested, the recommendation is to stay at home until symptoms resolve.

**Q: BCCDC guidelines say that close contacts of COVID-19 positive cases need to self-isolate for 10 days. Do kids need to stay home for 10 days every time that they are deemed to be in close contact?**

**A:** Recognizing that all will be exposed, the contact tracing, notification and self-isolation guidelines have changed. Close contacts will mostly be romantic partners and household contacts and those groups are at the highest risk for testing positive. Kids may be exposed through social contact, but they are testing positive at such low rates that they will not need to self-isolate. Different guidelines are being made based on risk.

**Q: Do we know what difference vaccination makes on the incidence of COVID-19 in kids?**

**A:** With the Delta variant and previous ancestral variants we have good data. This data showed 100% efficacy for 12-18 year-olds and equally high efficacy >90% In 5-11 year-olds. In the trial of 5–11-year-olds, there were no cases of severe disease in the vaccine or placebo group, so it could not be measured. The vaccine effectiveness against Omicron is not as robust, and we don't know the answer for Omicron in children yet. During the Delta wave, one review of 6 States of 915 admissions saw that 20% of those were incidental findings; none of the 915 admissions were fully vaccinated. There is also a vaccine efficacy of 90% in preventing MIS-C.

**Q: Does Asthma put children at higher for severe COVID?**

**A:** Asthma does not put you at higher risk for catching COVID. However, if asthma is in moderate to severe or unstable, or lack of compliance, that is when COVID symptoms can be more severe. Compliance monitoring is important!

**Q: What is the incidence or prevalence of Long COVID in children? Any advice in management?**

**A:** The management of chronic post-infectious disease is multimodal. Some studies look at a variety of different designs. A population-based cohort study of 40,000 cases and 80,000 controls from Denmark looked at what proportion of the population had symptoms beyond 4 weeks. In that rigorous study, it was found that 0.8% of children with COVID-19 had symptoms beyond 4 weeks including fatigue, loss of smell and loss of taste, dizziness and feeling of muscle weakness. Cognitive difficulties were seen much more often in the control groups in this study. Almost all children had resolution of symptoms after 5 months.

Most management is regarding supportive treatments such as stimulant medication for fatigue and graded exercise programs, similar to post-concussive management.

**Q: Can you advise or share resources on how to address children's anxiety about returning to school during the pandemic?**

**A:** We must make it unequivocally clear to the child that this is a healthy place to go, that the risk of getting sick is very low, and not hedging the bet. We want to be strong in this as a parent.

We also have to make sure staying at home is not appealing. For example, if you stay at home, there is no TV, and you have to sit in a room where you can read and do work.

Underlying anxiety and social anxiety can bubble up under these circumstances. A good resource is the Confident Parent: Thriving Kid program (for children under age the of 13), and the Kelty Mental Health Resource Center.

**Q: How should we recommend the use of COVID-19 Rapid Antigen Test kits to support keeping children in school as well as managing the exposure of risk outside of schools?**

**A:** This is the subject of a lot of work exploring models and pilot programs. Most recently, over the last 2 months, data has been used to develop models to look at various scenarios where these kits can be used under specific assumptions (i.e. looking at more transmissible scenarios, vaccine effectiveness scenarios, etc.). We're looking at a wide range of possibilities. When using this model, the strategies that were looked at include if everyone is tested everyday, every week, every 2 weeks, etc. as well as looking at different timings post-exposure.

Unfortunately, what was found that the size of the clusters and the risk of severe disease did not make much of a difference with regards to risk of cluster formation. As a result, considering the lack of access to tests right now, we have been recommending rapid tests to be used in areas that do not have good access to PCR testing.

We are continuing to look at pilot studies and modelling; studies are ongoing.

**Q: It seems there is a lot of croup with omicron. Should we treat it the way we always do and monitor respiratory distress, or are there COVID-19 specific treatments we should know about?**

**A:** This has been seen in the last 3-4 weeks. There is either so many children with COVID-19 right now that some will have croup, or this is a Omicron-specific unique proposition. When you see children in your office, you don't know what virus it is before testing. Croup is usually parainfluenza that can be caused by any virus, including COVID-19.

Treat as you would otherwise with any other virus, regardless of the cause. We give one dose of dexamethasone (0.6 mg/kg), which helps 6 hours after, but children usually recover because they are going outside to the cold air.

**Q: Rhinorrhea is a prominent symptom of Omicron, but it is not on the K-12 checklist. Does it matter if we diagnose COVID-19 in children correctly? Should we include this in the checklist?**

**A:** Those checklists are quite tricky, as they are taking artificial intelligence and trying to make a diagnosis without actually making a diagnosis. It is impossible to accurately make a diagnosis especially where report of symptoms may be difficult. As it is a very non-specific symptom, most children would check it, and this would lead to children staying home from school.

**Q: With high infectivity of Omicron and aerosol spread, is there a province-wide plan to implement HEPA filtered air purifiers in classrooms & N95 masks for the teachers?**

**A:** There is nothing that is not under discussion. It is constantly being assessed and evaluated. We do see very little transmission in schools, and by and large see transmission to only one other person. Usually, it is the person's very close social contact (e.g. best friend) that they typically have contact with inside and outside of school.

It is unlikely that any intervention will prevent student and staff members being exposed in the community and from being exposed to COVID-19 completely. It is also quite unlikely that right now a HEPA filter or N95 in classroom would change risk exposure by a lot.

There are ongoing checks of ventilation in the areas where transmission happens. It continues to be a priority.

**Q: Any recommendations for a post-viral cough that has gone on for weeks?**

**A:** Given the fact that Omicron is ubiquitous, 5 days after the peak of symptoms you are no longer contagious with a runny nose. Thus, if a child has a post-viral cough (which we commonly see), they are safe to go back to school. In terms of treatment, inhaled steroids such as Symbicort or a steroid puffer by itself like Qvar are suggested.

It is not just based on PCR positivity; what we want to know is if you have a live virus during the post-viral cough. Studies have shown that you do not grow a live virus. We are trying to be balanced in our approach; you do not need to isolate in general for just a post-viral cough. There's no need to send for another COVID-19 test.

**Q: Any direct concerns specifically from Omicron on kids?**

**A:** Hospitalization rates remain very low overall, and so far, we are not seeing higher admission rates.

**Q: Any recommendations on vaccine hesitancy in kids, particularly advice on how to best approach parents about this?**

**A:** Address vaccine hesitancy in parents and address vaccine fears in children. There are some resources on the BCCDC website. You can coach parents on things such as the "CARD" system (comfort, ask, relax and distract), preparing them in advance, providing some distraction, being truthful etc. Use of cartoons or social stories can also be helpful.

## Thanks to the speakers on the video:

- **Dr. Ran Goldman**, Pediatric Emergency Medicine Specialist, Co-Chair, Division of Clinical Pharmacology
- **Dr. Alex Choi**, Medical Health Officer, Vancouver Coastal Health

- **Dr. Tom Warshawski**, Associate Clinical Professor, UBC Department of Pediatrics; Chair, Childhood Obesity Foundation; Medical Director for Children and Youth, Interior Health Authority
- **Dr. Laura Sauvé**, Pediatric Infectious Diseases Specialist; Co-chair of the Pediatric Clinical Reference Group, Chair, Infectious Diseases and Immunization Committee, Canadian Pediatric Society
- **Moderator: Dr. Bruce Hobson**, UBC CPD Medical Lead