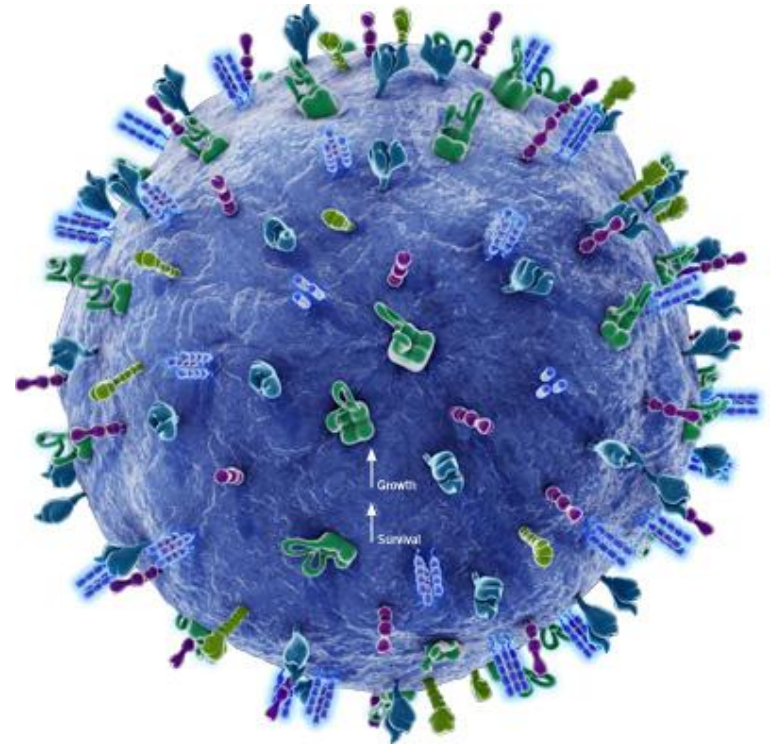


POST-CHEMOTHERAPY MEASLES, MUMPS AND RUBELLA TITERS IN A PEDIATRIC POPULATION

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Background

- Chemotherapy causes immune suppression, including:^{1,2}
 - A decrease in memory B-cells
 - A decrease in plasma cells in the bone marrow
 - A fall in immunoglobulin levels
- Children become susceptible to infectious processes, many of which they have been vaccinated against.



Why MMR?

- Ontario is experiencing higher than normal measles activity in 2015, with 20 incident cases as of June 3rd, compared to 22 cases in 2014.³
- Immunity rates in general population are 95-97% for MMR.⁴
- No consensus in the literature regarding what percentage of children are susceptible to MMR post-chemotherapy.

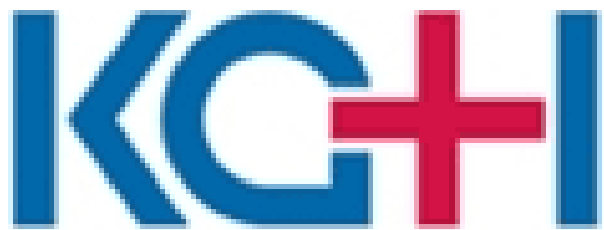


Objectives

1. To establish the percentage of children that are immune to MMR post-chemotherapy.
2. To determine the response to re-immunization in children who are not immune post-chemotherapy.

Currently at KGH

- Pediatric oncology patients have titers tested at 6 months post-chemotherapy.
- Non-immune children are re-vaccinated with MMR and re-tested 6 months later.
- Maximum of 3 vaccines, regardless of titer results due to potential risk of rubella arthropathy.



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Methods

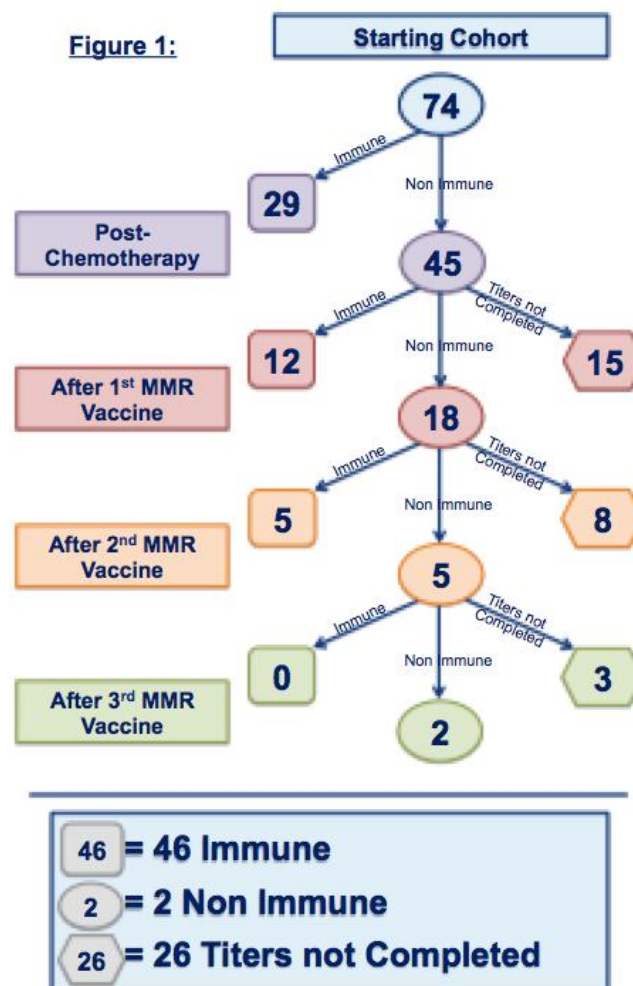
- Retrospective chart review
- Inclusion criteria
 - KGH pediatric oncology patient diagnosed between January 2001 and December 2014
- Exclusion criteria
 - Had not received chemotherapy
 - Currently receiving chemotherapy
 - Under 1 year at diagnosis

Demographics

- 74 patients were included in the main analysis
- Patients who had received a bone marrow transplant (BMT) or a second round of chemotherapy post-relapse were analyzed separately.

Sex	Male	45
	Female	29
Age @ Dx	1-3	25
	4-6	16
	>6	33
Dx	Leuk/Lymph	44
	Solid	30

Results

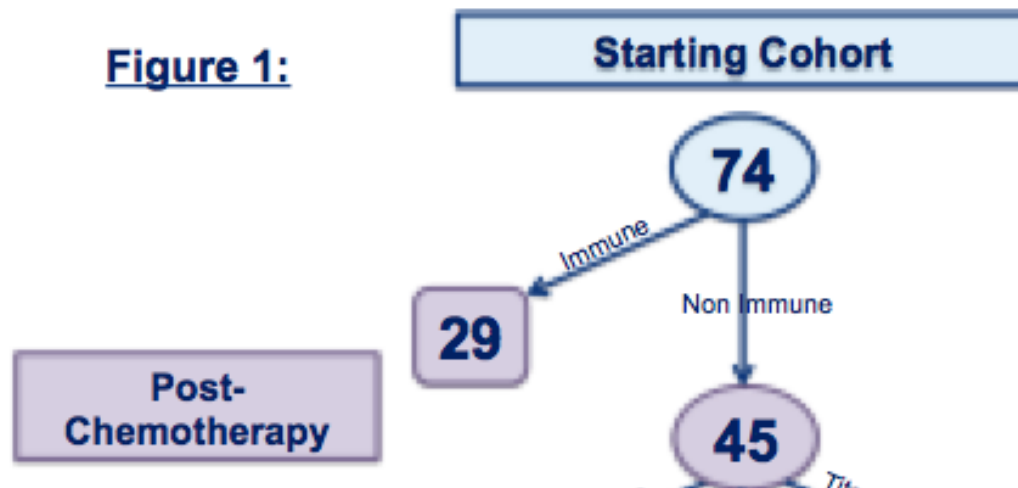


Results

Starting Cohort

74

Results



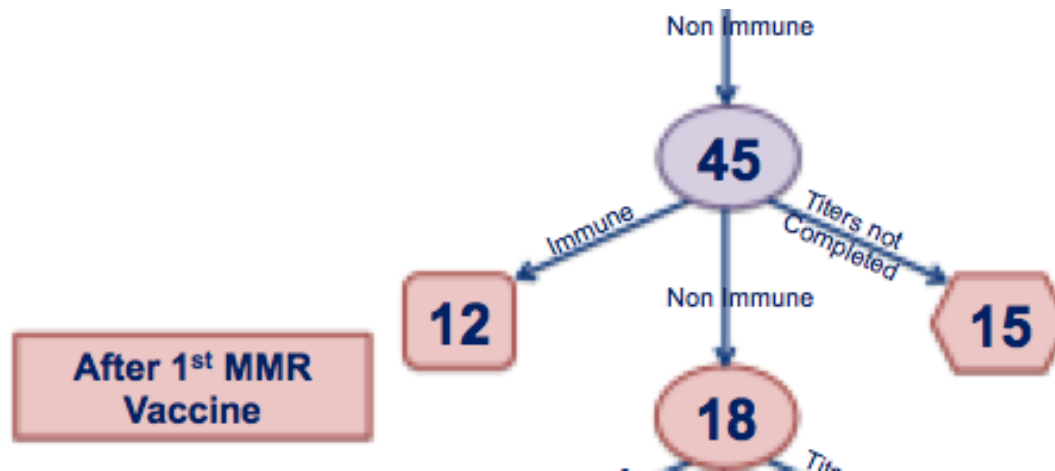
- 39% retained immunity to all three viruses.
- The remaining 45 patients were given MMR vaccine and re-tested in 6 months.

MMR Breakdown

- Of the 45 non-immune patients:
 - 29 were immune to 2/3 viruses
 - 16 were immune to 1/3 viruses
 - 6 were not immune to any virus
- Measles vs. Mumps vs. Rubella
 - 20 were lacking measles immunity
 - 36 were lacking mumps immunity
 - 17 were lacking rubella immunity



Results



- 12 seroconverted
- 18 remained non-immune
- 15 did not have titers taken due to relapse, error or an insufficient amount of time elapsed since the last vaccine.

Results

46 = 46 Immune

2 = 2 Non Immune

26 = 26 Titters not Completed

***Of the two patients that remained non-immune, one was not up-to-date on immunizations prior to diagnosis.

Results

- Patients had a higher likelihood of losing immunity to mumps, as opposed to measles or rubella ($p=0.002$).
- No statistically significant differences were found between sex, age group or cancer type.

Discussion

- Some recommend fixed schedule 1-2 vaccines without checking titers.^{2, 5}
 - Advantage: fewer lost to follow up
 - Disadvantage: insufficient in some, unnecessary in others
- One vaccine is not enough for many children.
 - Only 41 (55%) were immune after 1 vaccine (15 unknown)

Discussion

Trends in protective titer findings (not statistically significant):

1. Cancer type

- Leukemia/Lymphoma (34%) vs. Solid (46%) post-chemo

2. Age

- 1-3 (35%) vs. 4-6 (44%) vs. >6 (39%)

Conclusions

- Over half of pediatric oncology patients lose immunity to MMR post-chemotherapy
- Following the stringent re-immunization protocol utilized, almost all patients regained MMR immunity.
- However, those in whom the protocol was not completed represent a potentially vulnerable group that should be addressed.

QUESTIONS?
