Intellectual Property and License Management with respect to Vaccines

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Innovation, Information, Evidence and Research (IER)

World Health Organization
A modern vaccine is protected by multiple levels of IP often licensed from multiple partners.
Why vaccines are different to drugs

- True 'generic' vaccines do not exist

- Complex biological drugs: equivalence can not be demonstrated by simple tests. Full clinical safety and efficacy (or surrogate) testing of 'copy' required.

- Even in absence of patent barriers numerous barriers to vaccine production
  - Expertise, know how, previous clinical data
  - Cost (investment, production)
  - Clinical studies (possibly very large if comparing efficacy to existing vaccine)
IP barrier to basic vaccines

- D, T, Pw, Pa, HepB, HiB, IPV, OPV, measles, mumps, rubella, yellow fever.
  - Produced since at least 20 years ago therefore "impossible" that IP can present barrier to manufacture, use or sale of a "classical" formulation.
  - No relevant IP found.

- Exceptions
  - Improved formulations
    - Combinations, adjuvants, doses, delivery routes,..
  - Improved processes for manufacture
Examples of IP relevant to basic vaccines

- Use of pertactin/69K in acellular pertussis vaccine
  - GSK / Medeva
  - Work-around: don’t include it (FHA/PT)

- Combination vaccines containing low doses of T, P, etc
  - Use higher doses etc.

- Stick to 'old' formulation or develop work-arounds
  - Requires R&D capacity.
S. Pneumoniae vaccines

- Polysaccharide conjugates (Prevnar, Synflorix,..)
  - Polysaccharide purification described 1983 (WO8201995) all related patents expired.
  - Process of making a conjugate S. pneu vaccine US486012 expired.

- Other relevant IP:
  - Carrier protein: CRM, TT, DT, OMP,.. IP Expired.
  - Improved purification procedures (eg: cross-flow filtration with ammonium sulphate US6146912, granted in 2000): work around.
  - Conjugation methods. Some expired, some new improvements
Influenza vaccines

- **Background docs:**
  - WHO influenza IP landscape
  - PIIPA H5N1 landscape

- **Seasonal inactivated vaccines:**
  - Producing influenza vaccine in embryonated hens’ eggs has been carried out for more than 60 years, and has not yet been replaced as the standard industrial process.
    - IP to standard production methods not a barrier.
  - Some improvements patented:
    - Production on certain cell lines
    - Enhanced yields
    - Adjuvants to enhance immunity in older populations
Pandemic influenza vaccines

- **H5N1: PIIPA landscape analysis**
  - No potential barriers to making existing vaccine types (split, WKC, live etc)
  - Reverse Genetics: license available from Medimmune
    - WHO exploring other reverse genetics processes

- **H1N1:**
  - Conventional inactivated vaccine production: no barrier
  - Adjuvant for dose reduction:
    - Not essential
    - Patent on submicron oil-in-water emulsion (eg MF59) revoked in Europe, no equivalent in developing countries.
Conclusion

- For the bulk of **EXISTING** vaccines, patents are not a barrier to production
  - Possible exceptions include HPV (L1) and reverse genetics for pandemic influenza
  - In some cases patents on improved processes or formulations may be seen as a barrier – need R&D capacity to identify value, consider work-arounds, and license as appropriate.

- For NEW vaccines....
Landscape of patents on Vaccines

- > 10,000 patent applications (PCT) containing the word 'vaccine' in the claims
  - If these are not on existing vaccines, what are they on??

![PCT applications per year graph]

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WIPO / WHO patent landscape analysis

- Currently underway.. No data yet available
  - Examining different search techniques

- Preliminary observations…
  - Patenting patterns are changing: CN, IN, BR increasing rapidly
    - Priority country
    - Designated country (national phase)
    - US still dominates (>50%) but rate declining 2009-2010
  - Many patents on therapeutic vaccines but
    - TB =480
    - Influenza =667
    - Pneumonia =512 etc…
Future?

- New vaccines coming onto the market likely to have broad patent protection in wide geographical scope
  - Many innovations will be from current LMICs

- Know-how will still be a critical barrier
Innovation Pipeline

Investment in R&D critical
 company level, national level (universities, biotechs)…

Innovation Pipeline

Innovation | Patent

Research | Product

Revenue
License agreements

- IP is not a problem… its IP management that is a problem
- SEVERE lack of skill/know-how in some developing countries with respect to IP and licensing and license negotiations skills
  - Lack of respect for existing patents
  - 'Concerns' when the patent in question has no equivalent in the developing country
  - License agreements which control supply agreements for extended time periods / beyond vaccines etc.
    - Negotiated from a position of weakness…
    - Lack of competing license offers…
Potential capacity building activities

- Training courses on IP, IP management
  - WHO/DCVMN 2009

- Training courses on negotiating licenses and supply agreements

- Development of 'best practices' in licensing
  - How to ensure that R&D, tech transfer etc result in most affordable products in most needed places.
IP support offered by WHO to developing country vaccine manufacturers

- Country-request is often for FTO identification: legal opinion
  - Can only help with identifying some non-exhaustive IP which should be considered.

- Insufficient capacity in developing countries with respect to:
  - Patent lawyers with understanding of the science behind the technology
  - Scientists with understanding of IP searching and interpreting